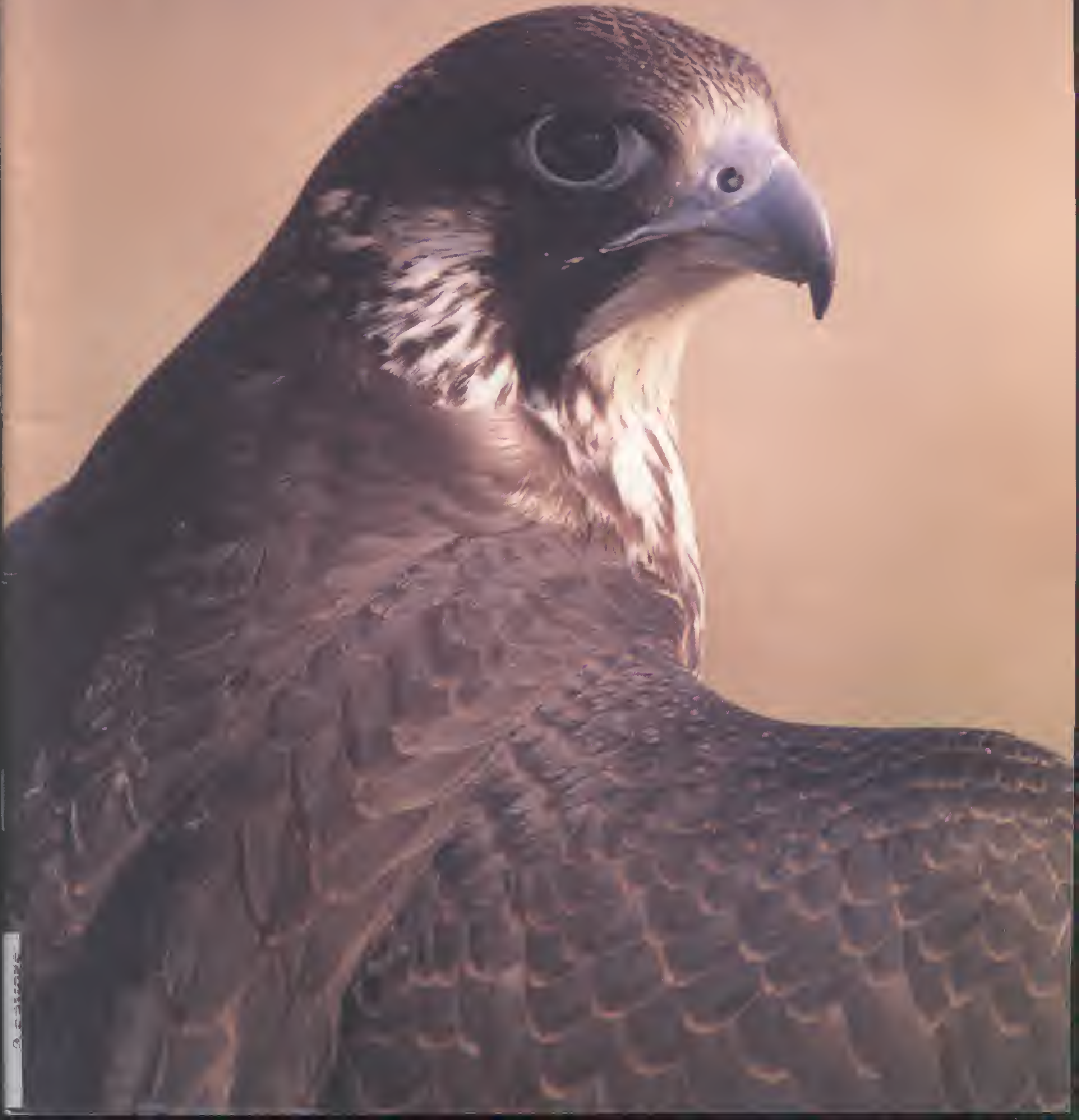
LIVING BIRD

For the Study and Conservation of Birds

SUMMER 1992



JOE McDONALD

Will the wood thrush go the way of the passenger pigeon?

Migrant songbirds such as this wood thrush face overwhelming threats: massive deforestation on their wintering grounds in Latin America, habitat changes from global warming, and increased nest predation on their breeding grounds. Only the unceasing efforts of people dedicated to the well-being of birds can prevent their extinction.

At the Cornell Lab of Ornithology we are committed to bird conservation through bird population monitoring, research, and education. Our programs increase public awareness of the problems birds face *and* promote viable solutions.

Help us help the birds—Ask a friend to join the Lab today.

Your continued support makes our work on behalf of birds possible. But there is one more thing you can do . . . ask a friend to join the Lab. If every Lab member brought in just one new member, our effectiveness as a force for bird conservation would be doubled. Please give your friends the handy membership application cards inserted in this issue and encourage them to join today.

Cornell Laboratory of Ornithology
For the Study and Conservation of Birds

A Publication of the
Cornell Laboratory of Ornithology

LIVING BIRD

SUMMER 1992 VOLUME 11 NUMBER 3

10th Anniversary Issue

Greetings from Sapsucker Woods

This issue marks a milestone in the history of *Living Bird*—the beginning of our second decade of publication. The Lab of Ornithology launched Volume I, Number 1 in the summer of 1982. Though the Lab had previously published an annual scholarly journal called *The Living Bird*, the new publication's attractive magazine format and quarterly publication schedule were changes intended to carry the Lab's mission of promoting the study, appreciation, and conservation of birds to a broader audience.

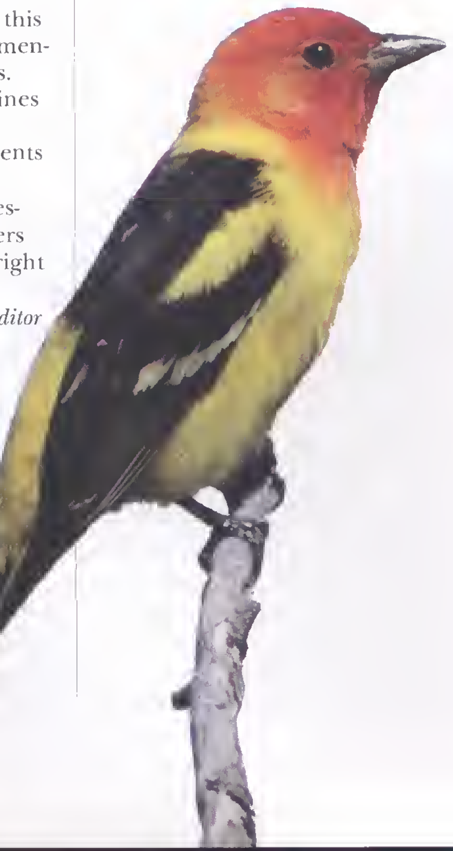
In the inaugural issue of the "*Quarterly*," Lab director Charles Walcott pledged to produce a magazine that would inform and excite readers, and also challenge them to become personally involved in the science of ornithology. "We are planning articles on virtually every aspect of bird study," said Walcott, "behavior, habitat studies, conservation, art, and the latest updates on ornithological research here and around the world."

Decade markers are a natural time to look back, take stock, and then determine which direction to go in the future. *Living Bird* is growing. What began as a 24-page publication is now 40 pages long, and we have plans of expanding still more. We will continue to bring you our unique blend of article topics, ranging from tough conservation issues and scientific study to reviews of the latest equipment and ways to enhance your birding enjoyment.

In keeping with our goal of promoting bird conservation through research and education, this issue of *Living Bird* focuses on a major environmental dilemma: the plight of neotropical migrants. The lead article, "Save Now or Pay Later," outlines the problems of habitat destruction here and abroad that threaten these birds, and also presents a list of actions we can take to help them.

As always, we welcome comments and suggestions from readers. It is only through your letters that we can determine whether we are on the right track with *Living Bird*.

— *Tim Gallagher, Editor*



Cover: *Less than two decades ago, the peregrine falcon seemed poised at the edge of extinction. Now peregrine numbers are up, but researchers continue to monitor the species at Padre Island, Texas, and other key migration areas. Story on page 14. Photograph by Tim Gallagher.*

Right: *Neotropical migrants such as this western tanager face unprecedented threats on both their breeding and wintering grounds. To find out what you can do to help them, see the article on page 8. Photograph by Art Wolfe.*

Back Cover: *This cattle egret is probably wondering why the photographer who snapped this picture is lying on a bed of oyster shells. Photograph by Larry B. Wales.*

Features

8 **Save Now or Pay Later**
by Greg Butcher and Rick Bonney
Now's the time for conservation action on behalf of migrant songbirds.

14 **The Peregrines of Padre Island**
by Tim Gallagher
Rare falcons gather by the hundreds each spring and fall at this vital migration staging area in the Gulf of Mexico.

21 **The Golden-cheek and the Ghost Subdivision**
by Mel White
An endangered species hangs on, deep in the heart of Texas.

24 **The Birds and the Damselflies**
by John Alcock
A familiar insect sheds new light on the mysteries of bird behavior.

Departments

4 **Letters**

5 **BirdNews**

Columns

6 **Spotlight** *by David S. Wilcove*
Eliminating protection for threatened subspecies like the Florida scrub jay would gut the Endangered Species Act.

30 **In the Field** *by Jack Connor*
The world needs more birders. Are you helping?

32 **My Turn** *by Herb Raffaele*
Are we guilty of scientific imperialism?

33 **Focus** *by Tim Gallagher*
Red-necked grebes; a nest portrait.

34 **Critics' Corner** *by Jeff Wells*
The latest in bird-listing software.

38 **The Catbird Seat** *by Pete Dunne*
Birding opens up an avenue of discovery.

LIVING BIRD

SUMMER 1992 VOLUME 11 NUMBER 3

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Letters

A Change for the Better

When I read that you were making changes in *Living Bird*, my heart sank. After reading the Autumn 1991 and Winter 1992 issues, however, I see that you are enhancing an excellent magazine, not spoiling it. And I'm glad to see that you intend to promote the enjoyment of birds as well as their conservation; I recognize the many threats to the natural world without being unrelentingly bombarded with doom-and-gloom articles.

Ten years back, when your predecessors were contemplating changing from an annual journal to a popular quarterly format, I was asked to make suggestions, and I replied that I'd like to see articles that weren't so scholarly as those in the annual yet weren't oversimplified either; the magazine should appeal to the intelligent layman. I think you have carried out my wishes perfectly.

To show my support for the Lab and your magazine, I plan to upgrade my membership to the next higher category when it comes up for renewal in the spring.

Dorothy R. Weaver
Atlantic Mine, Michigan

Out of Obscurity, a Call to Action

David Wilcove's timely article on the São Paulo tyrannulet ("In Praise of Obscurity," Winter 1992) eloquently brought to the fore the plight of the Brazilian Atlantic coast forests, with their extraordinary richness of flora and fauna.

I was, however, annoyed that the article delivers a powerful message and then abandons the reader to ponder the fate of those forests. There was no hint of any action that could help preserve the remaining forests.

Several U.S. conservation organizations are currently working with Brazilian organizations, both governmental and private, to save the precious remains of the Atlantic forest, including The Nature Conservancy, Conservation International, and the World Wildlife Fund.

Particularly relevant is The Nature Conservancy's participation in efforts to preserve the Lagamar area in the states of São Paulo and Parana. Hundreds of thousands of hectares of prime habitat for the São Paulo tyrannulet as well as a host of other fascinating creatures have been legally protected, and organizations are working to implement effective protective measures. *Living Bird* readers' financial contributions would help those efforts.

In case you don't have the address on the top of your desk, here it is:

The Nature Conservancy
International Program
1815 North Lynn Street
Arlington, VA 22209
(703) 841-5300

Dalcio K. Dacol
Washington, D.C.

Correction

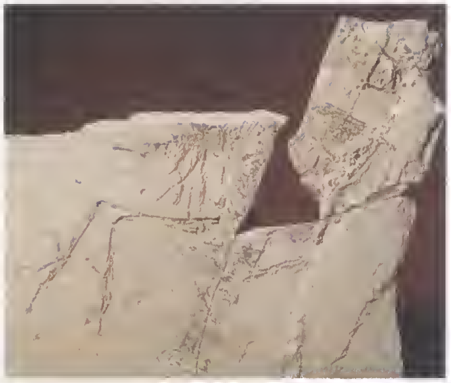
It was a pleasure to see the attractive layout you provided for my article ("Global Warming: An Imminent Threat to Birds?," Spring 1992). However, an unfortunate error somehow crept in after I saw the galleys. The maps illustrating present and predicted vegetation zones show areas shaded in brown with the legend, "no habitat change predicted." The legend is incorrect: Emmanuel et al.'s model in fact predicts *complex* climate and vegetation changes in those regions. In the context of my article, it was unnecessary to show such detailed changes.

Thank you for giving me the opportunity to provide this correction.

Elliot J. Tramer
Toledo, Ohio

We welcome letters from readers. Address letters to: The Editors, *Living Bird*, 159 Sapsucker Woods Road, Ithaca, New York 14850.

BirdNews


PAUL SERENO

Fossil Find may be “Missing Link”

A sparrow-sized, fossilized bird discovered in northeastern China is being hailed as the “missing link” between *Archaeopteryx*, the ancestral reptilian glider, and modern birds. Paul C. Sereno of the University of Chicago and Rao Chenggang of the Beijing Natural History Museum recently described the new bird in the journal *Science* (255:845-848;1992).

The 150-million-year-old *Archaeopteryx* has long been regarded as the first bird. Until now, the next-earliest birds known to science were 100 million years old. The new bird, named *Sinornis santensis*, or Chinese bird, fills the gap—it’s believed to be 135 million years old. Two similarly aged but less-complete fossil specimens from Spain and Mongolia also exist.

Compared with the Spanish and Mongolian birds, *Sinornis* provides more information: it’s the only one of the three with intact hand bones, which reveal the transition from reptilian forelimb to specialized flight wing. *Sinornis* has a grooved wrist bone, which would have allowed the wing to be tucked back while flying or resting, as modern birds’ wings do. Also, its finger bones seem to be well adapted for flight, whereas *Archaeopteryx* used its fingers to grasp prey. *Sinornis* does show some primitive, *Archaeopteryx*-like features, including a short, toothed snout and a reptilian pelvis.

Protection for Cave Creek Canyon

Legal protection is likely for Cave Creek Canyon, the Arizona hot spot known for its trogons, hummingbirds, and other wildlife. The Cave Creek Canyon Protection Act has passed the House of Representatives and is making its way through the Senate; conservationists say the bill is almost certain to become law.

Although passage of the legislation will ensure protection from mining, the future of the unique canyon is still in question. The U.S. Forest Service has proposed to make Cave Creek Canyon part of a new National Recreation Area, a move that biologists and local residents fear would only increase the pressures of development and demands for increased visitor access in the fragile desert habitat.

The Squeaky Wheel Gets the (ulp) Worm

Hungry nestlings behave in a way that seems maladaptive, even dangerous. Squawking loudly, they attract the attention of predators as well as parents. Recent research on American robins, however, shows that the benefits of conspicuous behavior outweigh the risks: noisy birds get fed first.

Researchers Henrik G. Smith and Robert Montgomerie of Queen’s University in Kingston, Ontario, videotaped 12 nests of six- to seven-day-old robin nestlings, then scored the budding film stars for begging intensity. To evaluate the influence of hunger on begging behavior, some nestlings were removed from the nest for an hour, then returned for a comparison with their more recently fed siblings.

Nestlings that started begging first, extended their necks highest, and held their beaks closest to their parents got fed first. Hungry nestlings begged more intensely than control nestlings, and as a result, the slightly starved birds got the first beakful of bugs more often. In addition, birds were influenced by their nestmates’ behavior. When hungry birds stepped up the intensity of their begging, their siblings followed suit.

Bill Would Ban Bird Imports

The declines of 40 bird species have been directly linked to the international pet trade. Now pet industry members and conservationists are watching Capitol Hill to see the fate of two competing bills to limit bird imports. The Wild Bird Protection Act, favored by conservationists, would immediately ban importation of wild birds for the pet trade. The alternative bill, the Exotic Bird Conservation Act, extends bird imports for another five years. At present, the international pet trade is responsible for the capture of about eight million birds annually.

In other developments, New Jersey recently became the second state in the nation, after New York, to ban sales of wild birds for pets. And Petland, one of America’s largest pet-store chains, has announced it will stop selling wild-caught parrots. Other actions worldwide may help to limit international trade in exotic birds. The European Community is reviewing a resolution to ban wild bird imports by member nations, and 53 airlines—American and foreign—have agreed to bar shipments of wild-caught birds.

In Memoriam: Peter Kilham

Birds lost a benefactor and the Lab lost a friend when Peter Kilham died last March. He was 87. Kilham invented the novel, tube-shaped bird feeder that’s known worldwide as the Droll Yankee®. He is also remembered for his bird song recording, “Birds of a May Morning.”

COMPILED BY CYNTHIA BERGER

Spotlight

SCRUB JAYS AND THE POLITICS OF RACE

by David S. Wilcove

The Endangered Species Act is up for reauthorization. Will subspecies and populations still find protection?

I remember the first time I found a flock of Florida scrub jays, or, more accurately, the first time a flock found me. All I did was open a bag of peanuts, and within minutes, the cheeky little panhandlers were perched atop my head, shoulders, and arms. I was 13 years old at the time, a surly participant in a family vacation to Florida, and while memories of Disney World have more or less faded, those fearless jays of 20 years ago can still bring a smile to my face. I spent the better part of an afternoon with them, but unlike most of my first encounters with interesting birds, I can't tell you the precise date. The Florida scrub jay, after all, is "only" a subspecies of a very common western bird, and according to the rules of bird watching, "subspecies don't count." Having seen lots of western scrub jays in previous years, I never bothered to write down the date I first encountered their Florida kin.

It never occurred to me that the rules of bird watching would one day be endorsed by the Secretary of the Interior in an entirely different context: to determine which creatures should be protected under the Endangered Species Act. The act allows the secretary to protect imperiled species and subspecies of plants and animals, as well as distinct populations of vertebrates. In 1990, when forced to choose between astronomers who wished to build telescopes on Arizona's Mount Graham and the Mount Graham red squirrel, an endangered subspecies of the common red squirrel living in the proposed construction zone, Interior Secretary Manuel Lujan lamented, "Nobody's told me the difference between a red squirrel, a black one, or a brown one. Do we have to save every subspecies?" By expressing displeasure with his legal responsibility to protect subspecies as well as species, Secretary Lujan was lending his support to opponents of the Endangered Species Act, who are eager to eliminate protection for both subspecies and populations.

Their reasoning is simple: No subspecies or populations means a shorter list of endangered plants and animals, and a shorter list means fewer hassles. Without a protected subspecies of the spotted owl, logging of the ancient forests of the Pacific Northwest might not be blocked. Without a listed population of the California gnatcatcher around San Diego, real estate developers could convert more of California's coastal scrub into housing tracts. Because the Endangered Species Act is up for reauthorization this year, a battle over the issue of protecting subspecies and populations seems imminent.

For the Florida scrub jay, a protected subspecies under the act, the outcome could be a matter of life and death. The bird's extinction would not leave us bereft of scrub jays, since other races inhabit the western United States and Mexico. Nevertheless, the case of the Florida scrub jay demonstrates why saving subspecies and populations is the right thing to do.

What might we lose if the Florida scrub jays vanish? A unique opportunity to glean some fundamental insights about the way environmental conditions mold social behavior. Behaviorally, Florida scrub jays differ strikingly from their western relatives. In the western United States, scrub jays disperse from their birthplaces in search of their own territories before they are a year old. But in Florida, young jays usually remain for one or more years with their parents, assisting them in raising new generations of siblings. For over 20 years, this difference has intrigued ornithologists Glen Woolfenden and John Fitzpatrick, who have been studying a population of scrub jays in central Florida. Their extraordinary work has provided us with a rich portrait of jay society.

Together, parent jays and their helpers defend a territory of about 25 acres, which they occupy year-round. The territory is "owned" by the breeding pair, and ownership is passed on to a sequence of replacement breeders or offspring heirs indefinitely. If one of the breeding pair dies, the survivor usually acquires a new mate and continues to control the territory. On the rare occasions when both breeders disappear at once, the dominant nonbreeding male among the helpers acquires a mate from outside, inherits the territory, and becomes a breeder. "Divorce" is very rare among Florida scrub jays, with most pairs staying together until death.

Thus, a young Florida scrub jay has very limited opportunities to acquire a territory and mate of its own. One way, as noted above, is through inheritance. Another way is by finding a widowed jay in another territory and moving in as its mate; this approach is especially popular with young females. Young males often employ a third strategy. With assistance from parents and other family members, a male helper expands his natal territory by fighting with his neighbors. The young male then pairs with a female from outside the family (thereby avoiding incest), and the two begin to defend the newly captured ground, which sometimes includes a portion of his parents' original territory. The male's parents and family members retreat to their now-shrunken territory, and the new couple vigorously defends its turf against outsiders. Remarkably, hostility toward the male's family develops much more slowly, and years later, father and son can still traverse each other's territories unchallenged.

Woolfenden and Fitzpatrick believe this complex social behavior is a consequence of the birds' highly restricted habitat. Florida scrub jays occur only on ancient sand dunes that now support a peculiar, dwarf oak habitat. One of their main population centers is a 10-by-100-mile area known as the Lake Wales Ridge—a region formed millions of years ago when rising seas washed across much of peninsular Florida and deposited a strip of enormous sand dunes in the center of the state. Today, the dunes are dominated by an elfin forest or "scrub" of oaks, hickories, pines, and rosemary. Since scrub habitat is naturally scarce, the odds of a young bird finding a vacant territory are slim to none. Natural selection has favored birds that remained with their parents, assisted them in the production of more offspring, and waited until a vacancy appeared—not unlike the strategy employed by young New Yorkers who live with their parents while waiting for a rent-controlled apartment to open up. What at first appears to be rather altruistic behavior on the part of the jays is, in the words of John Fitzpatrick, "a selfish adaptation to living in a crowded, highly competitive environment."

Unfortunately for the jays, Florida's scrub is a fine place to grow citrus trees and build houses. About 90 percent of the Lake Wales Ridge scrub has already been destroyed, with more acres vanishing every day. In a state where frenzied development has become a virtual religion, the already crowded world of the scrub jay is constantly shrinking.

And that may be the most important reason of all to worry about the jays. The ancient scrub of the Lake Wales Ridge supports one of the highest concentrations of rare species in the world. At least 33 plant species restricted to scrub are either listed as endangered species or under consideration for listing by state and federal authorities. Included among them are the Lake Placid scrub-mint, whose leaves contain an organic insect repellent, a mouse, a firefly, and a nearly legless lizard that slithers through the sand. Among this group, the jay stands out as a "flagship species." It is colorful, charismatic, and tame. It captures the attention of people who will never see or hear about the Lake Placid scrub-mint or the sand skink. Moreover, the lands we protect for the benefit of the jays are certain to harbor other rare plants and animals, including species whose very existence may be unknown to us now.

For the embattled jays, protection against the interior secretary's efforts to remove them from the endangered species list has come from an unlikely source: the laboratories of the University of Chicago. Recent biochemical studies conducted there by A.T. Peterson indicate that Florida scrub jays are, in fact, a distinct biological species and not "merely" an isolated race of an abundant western bird. This means that even if opponents of the Endangered Species Act succeed in eliminating protection for subspecies and populations, Florida scrub jays will still be covered. Good news for them, certainly, but it still leaves plenty of other endangered animals out in the cold, including Cape Sable seaside sparrows, least Bell's vireos, light-footed clapper rails, bald eagles, peregrine falcons, roseate terns, grizzly bears, and gray wolves—all of which are protected as subspecies or distinct populations. Secretary Lujan and opponents of the Endangered Species Act keep forgetting a simple truism: Subspecies and populations become endangered for the same reasons species do. We destroy their habitats or we pollute their air and water. Ignoring the messenger won't change the message. ■

DAN POLIN

Florida scrub jay society packs the maximum number of birds into a constantly shrinking, sandy patch of scrub that's home to other endangered species as well.

David Wilcove is an ecologist with the Environmental Defense Fund in Washington, D.C. He also serves on the board of directors of the U.S. and Pan-American sections of the International Council for Bird Preservation.

Further Reading

Bourne, J. "Treasures in the scrub." *Defenders* 66(6): 13-17; 1991.

Woolfenden, G.E., and J.W. Fitzpatrick. "Florida scrub jays: A synopsis after 18 years of study." Pages 241-265 in *Cooperative Breeding in Birds*, P.B. Stacey and W.D. Koenig, eds. (Cambridge: Cambridge University Press; 1990).

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reg Butcher and Rick Bonney

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bler), and two species had declined seriously (red-eyed vireo and hooded warbler), even though habitat for all these birds still seemed plentiful.

If you know why this trend occurred, you've been keeping up with current ornithological literature. The culprit is known as forest fragmentation. Although little had changed *within* the undisturbed forest, lots of development had occurred *around* it, and the study area had become increasingly isolated from similar habitat nearby. Forest fragmentation is bad for woodland birds because it renders them susceptible to predation and nest parasitism. Predators such as jays, crows, grackles, raccoons, and cats, as well the parasitic brown-headed cowbird, are abundant in disturbed, open habitats, and less common in large woodlands. But if a forest is dissected by roads, power line cuts, and the like, or if it becomes surrounded by open or suburban habitat, then predators and cowbirds can penetrate a forest with ease.

Next question: What did the declining birds on The Connecticut Arboretum have in common? Next answer: All except the ruffed grouse were neotropical migrants, a name that refers to about 250 species of birds that breed in North America but winter south of the border, either in Mexico,

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SAVE NOW *or* PAY LATER

by Greg Butcher and Rick Bonney

Migrant songbirds face an uncertain future, unless we take action now

In 1976, as a junior at Connecticut College, Greg Butcher participated in a long-term census of birds and vegetation in The Connecticut Arboretum in New London, Connecticut. The census had started in 1952, the year of his birth, and focused on two areas: an old field abandoned just before the study began, and a mature, mixed forest virtually uncut since the Revolutionary War.

Quiz question: After 24 years, which habitat showed the greatest change in bird populations?

If you answered "old field," you are correct. Animal populations change quickly as a field reverts to shrub and then forest. In this case the pheasants, goldfinches, and field sparrows common in the weedy field had given way to red-eyed vireos, black-and-white warblers, and American redstarts—birds common in most eastern woodlands.

Nevertheless, if you discounted the possibility of significant bird population changes in the "undisturbed" forest, you're in for a surprise. Even though the vegetation structure had changed very little in two decades, four bird species had disappeared (ruffed grouse, eastern wood pewee, black-throated green warbler, and Canada warbler), and two species had declined seriously (red-eyed vireo and hooded warbler), even though habitat for all these birds still seemed plentiful.

If you know why this trend occurred, you've been keeping up with current ornithological literature. The culprit is known as forest fragmentation. Although little had changed *within* the undisturbed forest, lots of development had occurred *around* it, and the study area had become increasingly isolated from similar habitat nearby. Forest fragmentation is bad for woodland birds because it renders them susceptible to predation and nest parasitism. Predators such as jays, crows, grackles, raccoons, and cats, as well the parasitic brown-headed cowbird, are abundant in disturbed, open habitats, and less common in large woodlands. But if a forest is dissected by roads, power line cuts, and the like, or if it becomes surrounded by open or suburban habitat, then predators and cowbirds can penetrate a forest with ease.

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ILLUSTRATION BY STEVE CARVER

ARTHUR C. SMITH (GRANT HEILMAN PHOTOGRAPHY) 2

Neotropical migrants such as the yellow warblers, above, and the golden-winged warbler, far right, are extremely vulnerable to habitat changes in North America, where they breed, and also on their wintering grounds in Latin America. Below right, one result of forest fragmentation: a cowbird has laid its eggs in a warbler nest.

the West Indies, Central America, or South America.

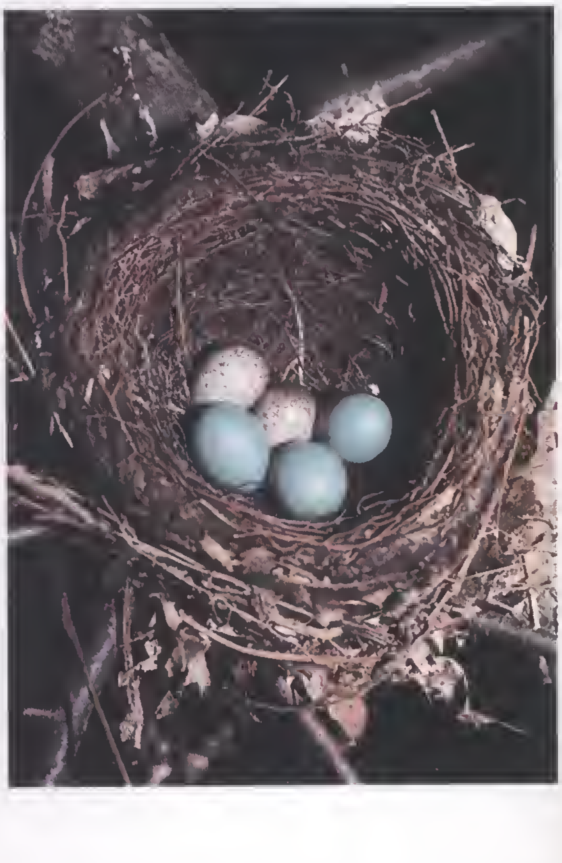
Final question: Why did neotropical migrants decline more than other species? Probable answer: They are more vulnerable than other birds to forest fragmentation because they tend to nest on or near the ground, they build open, cup-shaped nests that are easy for predators and nest parasites to spot, and they have time to raise only one brood per year.

Now, declining birds on The Connecticut Arboretum alone would probably not be cause for worry. Unfortunately, similar declines of neotropical migrants, in particular those that prefer forest interior habitats, have been documented elsewhere, especially along the Atlantic Coast in the megalopolis that extends from Portland, Maine, through Richmond, Virginia. Taken together, these declines have led to increasing concern that forest fragmentation on summer breeding grounds poses a major threat to the survival of several neotropical bird species.

If you follow the conservation news you're probably aware of another problem related to migratory birds: deforestation in Latin America where our summer birds spend the winter. Although the exact effects of deforestation on wintering migrants are still under investigation, in 1989 Chandler Robbins of the U.S. Fish and Wildlife Service (USFWS) and three colleagues published a sobering paper showing that deforestation could well be causing declines in a number of neotropical migrants. These birds are highly susceptible to winter habitat loss because their tropical wintering region is very small compared with the temperate breeding area they use in North America. In fact, densities of migrant species on the wintering ground may be five to eight times higher than on the breeding grounds. As a result, the destruction of just a small amount of tropical habitat can have a huge effect on migratory bird populations. Species that are geographically restricted to a small range, such as the cerulean and golden-cheeked warblers, face the greatest risk. And areas with some of the highest rates of deforestation—the Greater Antilles, Mexico, and Central America—also have the greatest concentrations of migrants.

Furthermore, most tropical forests are cut down to make way for agriculture. Therefore, even bird species that can use cleared and scrubby habitats may be exposed to harmful agricultural chemicals, especially pesticides. Some pesticides, including chlorinated hydrocarbons such as DDT, have been outlawed in the United States but are still supplied to Latin American and Caribbean farmers.

Mounting concern for the future of neotropical migrants among numerous ornithologists and conservationists led to a December 1989 symposium, sponsored by the Manomet Bird Observatory, on the conservation and biology of these birds. At that symposium, most participants agreed that the threats to these birds were serious and many, and that population declines were getting worse. In fact, Sidney Gauthreaux of Clemson University used data from radar images of migrating birds to suggest that migration across the Gulf of Mexico may be one-half of what it was in 1960.

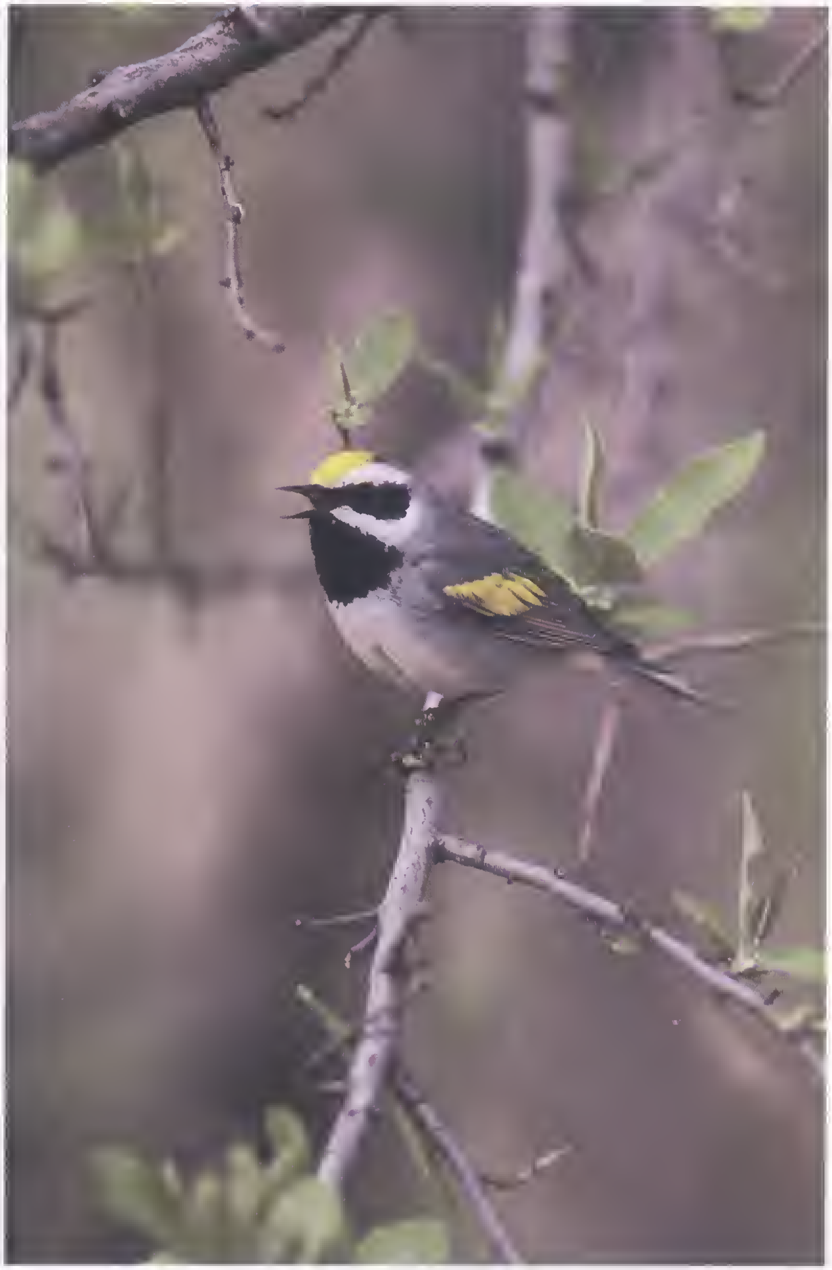


TODD FINK/DAYBREAK IMAGERY

What to do? Enter the National Fish and Wildlife Foundation, a quasi-governmental group founded by Congress in 1984 to promote innovative public and private partnerships to enhance the conservation of the nation's natural resources. In 1990 the Foundation launched a neotropical migratory bird conservation program called Partners in Flight—Aves de las Americas, which has been promoting bird research, monitoring, and conservation at an impressive scale. Already eight federal agencies have signed a Memorandum of Agreement to cooperate on this issue, including all five major landowning agencies: the U.S. Forest Service, Bureau of Land Management, National Park Service, USFWS, and Department of Defense. In addition, a number of nongovernmental organizations, including the Cornell Lab of Ornithology, Conservation International, and the Smithsonian Migratory Bird Center, have signed a Memorandum of Understanding to work with the eight government agencies.

The goals of Partners in Flight are to improve our understanding of neotropical migrants, to identify those species most at risk, and to develop plans for protecting their habitat. Although the program is still young, progress has already been made. Five central working groups have been established—research, monitoring, legislative, international, and information and education, with an additional five regional working groups organized throughout the United States and the Caribbean. These groups comprise individuals from the various government agencies as well as conservation groups, and all are at work developing plans for migrant bird conservation. Two national meetings have been held, and a third, planned for September 22-25, 1992, in Estes Park, Colorado, will focus on putting current knowledge about neotropical migrants where it's most needed—into the hands of various land managers. In addition, the information and education working group is producing a newsletter, of which two issues have already been published, and a slide show aimed at land managers and the informed public, which will soon be available.

Some people are concerned that such a massive effort for neotropical migrants is misguided. They point out that few of the officially listed endangered species in the United States are neotropical migrants, that populations of some permanent residents and short-distance migrants are declining more rapidly than the neotropical migrants, and that in tropical countries, year-round residents are the most endangered species. The critics may be right on all three counts. Nonetheless, we believe the neotropical migratory bird conservation program is completely justified and deserves a high priority.



Conservationists must work on behalf of neotropical migrants now because the sheer complexity of the migratory system makes these birds vulnerable in ways that resident birds are not. Consider: a migrant requires habitat not only on the breeding grounds and the wintering grounds but in the migration zone between. For example, destruction of critical coastal habitats along the Gulf of Mexico might leave migratory birds with no place to land following their nocturnal overwater flight. Therefore, even if all breeding and wintering habitats for migrants were preserved, their populations could still plummet.

Or contemplate global warming scenarios, which suggest that the heat will be turned up most in temperate zones. This could allow increased survivorship of nonmigrants that winter in these areas. Such warming could, however, be disastrous for neotropical migrants: competition with increasing resident birds would probably result in much less space for migrants during the breeding season, even if wintering habitats and migration routes remained healthy.

Away from the megalopolis, much of the northeastern United States is reverting to forest because marginally productive farms are being abandoned. Increased woodland should be a boon for forest-dwelling neotropical migrants. However, if wintering habitat is shrinking because of tropical deforestation, migrants could decrease despite improving conditions on the breeding grounds.

A migratory bird conservation program also offers a tremendous political advantage. Many other conservation programs promote the idea that we are all in today's environmental mess together. When dealing with migratory birds, however, the connections are particularly obvious. After all, birds fly from public land to private, from state to state, and from nation to nation. While efforts have previously been made to promote conservation south of the U.S. border, many more will be made under the Partners in Flight banner. Because the program focuses on bird habitats on the breeding grounds, wintering grounds, and migratory stopover sites, it necessarily is interested in bird habitat throughout the New World. Much of this habitat supports endemic species as well as migrants, therefore much of the work of Partners in Flight should benefit all birds, regardless of their migratory status.

Partners in Flight also represents one of the few times that government agencies have reached out to the public and to private organizations in a cooperative effort for conservation. At the Lab of Ornithology, we're working to help make it a model for the future. ■

Greg Butcher is director of the Lab's bird population studies program and chair of the monitoring working group of Partners in Flight. Rick Bonney is director of education and information services at the Lab and co-chair of the Partners in Flight information and education working group.

Further Reading

Askins, R.A., J.F. Lynch, and R. Greenberg. "Population declines in migratory birds in eastern North America." *Current Ornithology* 7:1-57; 1990.

Finch, D.M. "Population ecology, habitat requirements, and conservation of neotropical migratory birds." Gen. Tech. Rep. RM-205. Fort Collins, Colorado: USDA, Forest Service. Rocky Mountain Forest and Range Experiment Station, 240 W. Prospect Rd., Fort Collins, CO 80526. 26 pp; 1991.

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Robbins, C.S., J.R. Sauer, R. Greenberg, and S. Droege. "Population declines in North American birds that migrate to the neotropics." *Proceedings of the National Academy of Sciences* 86:7658-7662; 1989.

What You Can Do

You don't have to be a full-time scientist or political activist to help neotropical migrants. Follow these simple steps and get involved today!

Step 1. Educate yourself. Learn as much as you can about the problems facing neotropical migrants, and about possible solutions. Here are some useful resources:

■ **The Migratory Bird Information Kit**, co-produced by the Smithsonian Migratory Bird Center and the National Audubon Society, contains a wealth of information and "how-to" materials, including 1) a 32-page, full-color booklet on the ecology of forest-dwelling songbirds and the reasons for their decline; 2) a bilingual checklist of songbirds that migrate to Latin America and the Caribbean; 3) an international directory of Latin American groups that want to establish partnerships with U.S. groups; and 4) briefing papers that tell how to protect songbird habitat in your community, in Latin America, and through federal and state policies.

To get your copy, send $6.50 to: Migratory Songbird Coordinator, National Audubon Society, 666 Pennsylvania Avenue SE, Washington, DC 20002.

■ **Partners in Flight—Aves de las Americas** is described in detail in the accompanying article. Of particular interest to citizen activists are the regional and state working groups organized to establish strategies for habitat protection and management.

To receive the free quarterly *Partners in Flight* newsletter, write to Peter Stangel, Program Director, National Fish and Wildlife Foundation, 1120 Connecticut Avenue NW, Washington, DC 20036.

■ **The following books** provide in-depth information on the decline of migratory bird populations. They're available at many bookstores and libraries:

Birds in Jeopardy by Paul Ehrlich. Stanford: Stanford University Press; 1992.

Where Have All the Birds Gone? by JohnTerborgh. Princeton, New Jersey: University Press; 1989.

Step 2. Be a Desktop Activist. You can help neotropical migrants right from your desk. Here's how:

■ **Support state nongame programs:** Check the box marked "nongame programs" on your state income tax form. Your tax-deductible donation will help fund research and management programs for nongame species, including migratory birds. If your state doesn't have a "check-off" program, contact your wildlife department to start one. A list of regional nongame coordinators is provided in the Migratory Bird Information Kit (see above).

■ **Write to your elected representatives.** Support legislation that will help migratory birds.

The Endangered Species Act is scheduled for reauthorization in 1992. Although only a handful of migratory bird species are currently on the threatened and endangered lists in the United States, many species and subspecies languish in the huge backlog of candidates waiting to receive attention.

We need legislation that provides protection for candidate species *before* they reach the threatened or endangered list. Urge your elected representatives to support HR 4045. Point out that rescuing species from the brink of extinction is often impossible and always expensive.

Federal Appropriations: Congress appropriated significant funding for migratory bird and other nongame programs within federal agencies for the first time last year. This year, environmental groups are calling for a $6.44 million add-on for nongame bird programs. Write to your representative to advocate increased appropriations for migratory bird programs.

Foreign Assistance: Rapid population growth in many Latin American countries puts a strain on forests and other resources; the protection of tropical forest habitat hinges not only on conservation policy but also on international family planning efforts. Congress is considering important legislation on family planning as well as sustainable forestry and agriculture, energy, biodiversity, and other development issues in Latin America. Let your elected representatives know that you support foreign assistance that will promote sustainable use of natural resources.

To voice your support for legislation, write to:

The Honorable (your Congressman)
U.S. House of Representatives
Washington, DC 20501

The Honorable (your Senator)
U.S. Senate
Washington, DC 20501

Step 3. Be an Activist in Your Own Backyard. Migrating birds need stopover sites for food and rest. Your backyard can be a temporary haven for some migrants, especially if it's landscaped to provide natural foods and shelter.

Here are some great books to help you get started. Your library or county extension office will have other publications pertinent to your region.

The Wildlife Gardener, by John V. Dennis. New York: Alfred A. Knopf; 1988.

Songbirds in Your Garden, by John K. Terres. New York: Harper and Row; 1987.

Note: When enhancing your backyard habitat to attract birds, don't forget to make it a *safe* place, too. Avoid pesticides, bell your cat, and position your feeders to prevent deadly window collisions. Make sure your compost pile and garbage cans don't attract songbird predators such as raccoons.

Step 4. Put Your Birding Skills to Work. Enjoy the rewards of working with others to protect migratory birds.

■ **Participate in monitoring and banding programs.** Volunteer programs include the Breeding Bird Survey, the Breeding Bird Census, state atlasing programs, Christmas Bird Counts, Winter Bird Population Studies, and banding projects. There's no better way to get hands-on involved.

For a directory of volunteer opportunities with federal agencies, send $1.00 to: Volunteer Directory, American Birding Association, P.O. Box 6599, Colorado Springs, CO 80934. Or contact your local Audubon Society, state ornithological society, local bird club, or the Lab of Ornithology to find out about organized monitoring programs in your area.

Step 5. Spread the Word.

■ **Speak out.** Multiply your efforts by spreading the word through the media: write a letter to the editor, or an op-ed piece. How about making presentations to local clubs and teachers' groups? You can borrow a terrific slide show produced by Partners in Flight expressly for this purpose. The show will be available from the National Fish and Wildlife Foundation in August 1992.

■ **Forge international friendships.** International cooperation will be essential to stem the tide of declining bird populations. The Migratory Bird Information Kit (see above) tells you how to establish partnerships with—or send birding equipment to—Latin American conservation groups. The National Audubon Society's "Save our Songbirds" program matches local Audubon chapters with Latin American nongovernmental organizations.

Whatever approach you take—writing letters, landscaping your backyard, censusing birds, or sending equipment to a Latin American partner—the most important thing is to get started. Take one simple step to protect migratory birds. If you don't, who will?

Susan Carlson
Chapter Program Director
National Audubon Society

This windswept barrier island draws scores of migrating falcons and the researchers who come to study them

Falcon researcher Bud Anderson releases a newly banded peregrine he trapped minutes earlier on the tidal flats of Padre Island, Texas.

The Peregrines of Padre Island

Text and photographs by Tim Gallagher

OCTOBER 8—As I drive across the causeway leading from Port Isabel to South Padre Island, Texas, I'm amazed at the number of buildings I see: luxury high-rise hotels, restaurants, souvenir shops, condos, real estate offices. A gaudy billboard stuck in the middle of a mudflat announces the island's name and cautions us not to litter, while a bronze statue of Spanish missionary Padre Ballí—the "father" of Padre Island—stands with a hand raised to bless passersby as they reach the end of the causeway.

I can't help but remember how different the island looked the last time I was here, some 20 years earlier. The Queen Isabella Causeway had not yet been built, stores and restaurants were hard to find, and there were no high-rise hotels—just a few tiny beach motels on the southernmost stretch of this long, narrow barrier island. But one thing has not changed in the two decades since I last visited Padre Island, and it is the same thing that drew me here both times. This thin strip of storm-swept sand dunes is the scene of a great natural spectacle: the biannual gathering of migrating peregrine falcons en route to and from their far northern nesting areas.

Padre Island is a typical barrier island—long, narrow, and dune covered. Starting just offshore from Corpus Christi, it follows the Texas coast almost all the way to Mexico, more than 120 miles south. But three-quarters of the way down the island's length, Mansfield Channel slices through, allowing shrimp boats, pleasure crafts, and other shipping to enter and leave Laguna Madre from the Gulf of Mexico. Called "the cut" by locals, the channel divides Padre into a north and a south island. The bulk of the north island has been preserved as the Padre Island National Seashore,while South Padre Island is a popular Texas tourist trap. Sun-seekers and other visitors flock here by the thousands to enjoy the warm weather, picturesque beaches, or the fishing. A few come for the birds.

In that respect, South Padre Island is no disappointment, especially for a peregrine watcher. The island is a convenient migration midpoint for the falcons, where they can rest and build up fat stores before continuing on a journey that may stretch from the Arctic Circle all the way to Argentina or Chile. The falcons, which are mostly the "tundra" subspecies of peregrine, pass the bulk of the year in South America, spending only the mild summer months on their breeding grounds in Alaska, Canada, or Greenland.

Though large numbers of peregrines pass through other places in North America on migration—Assateague Island, Cape May—Padre Island is unique in two respects: first, unlike the other areas, many falcons stay on Padre for weeks at a time, using it as a staging area; and second, peregrines gather here in significant numbers during both autumn and spring migrations. The other peregrine migration hot spots are outstanding in the autumn, when hordes of newly fledged juveniles make their first trek southward, but the northward migration in spring produces barely a trickle of falcons. Consequently, Padre Island has been a boon for falcon research.

OCTOBER 9—Before I arrive at the beach house where I'll be meeting a group of falcon researchers, I spot a beautiful adult female peregrine perched on the rigging under a water tower. She is amazingly tame. I set up my camera and tripod right under her and snap pictures at will. Her lack of suspicion is fairly typical for the Arctic birds, which have little contact with humans most of the year. As I pack up my gear and leave, she is still perched there, calmly watching.

Tom Maechtle, head of the Padre Island Peregrine Falcon Survey (PIPFS), has been studying the falcons on the island since 1985. Each spring and fall, he brings a team of researchers to Padre Island, where they spend an entire month studying peregrines, watching their behavior, trapping and banding them, and collecting falcon blood samples for DNA and contaminant analysis.

"I've been fortunate to have such a dedicated group of people working with me on Padre Island," says Maechtle. "The same people return year after year, and each one is an expert falcon trapper. Some of them take vacation time from their regular jobs to come down here. Our success depends on them."

Fortunately, the peregrine falcon has had little trouble over the years attracting the attention of humans who are dedicated to its well-being. When DDT and other persistent chemicals in the environment caused the peregrine falcon population to crash in the 1960s, prominent ornithologists such as Tom Cade of Cornell University rushed to turn around the species' perilous decline. Cade established The Peregrine Fund and enlisted the aid of scores of falcon enthusiasts willing to work long hours for minimal wages to help bring the falcons back. Thanks to their efforts, peregrine falcons once again breed in the eastern United States (where they had been extirpated) and their numbers are up throughout North America.

Tom Maechtle, who now lives in Boise, Idaho, worked for The Peregrine Fund for several years when it was headquartered at the Laboratory of Ornithology. He stayed at the "hawk barn" in Sapsucker Woods, where peregrines were being bred in captivity to provide young falcons for the reintroduction program. "I tended peregrine hack [release] sites every summer while I was in high school," says Maechtle. "I stayed at the first hack site at Taughannock Falls near Ithaca in the mid-1970s. Then after I graduated I came to work at The Peregrine Fund full time."

Many of the falcon researchers I spoke with had similar stories to tell. Most had been obsessed with falcons since childhood. For Oscar Beingolea, who came all the way from Peru to trap falcons on Padre Island, the peregrine falcon is the supreme winged predator—a bird of power, grace, and beauty. Like the other team members, he is fascinated by the mystery of where the peregrines come from and where they go on migration. He believes the only way that we can even begin to understand the peregrine migration is to retrap large numbers of banded Arctic falcons in South America.

"We have retrapped several birds in Peru that were banded in North America," says Beingolea, "three from Padre Island, Texas, two from Cape May, New Jersey, and one from Rankin Inlet, Canada. The last bird's story is very nice, because he was banded at a nest in Rankin Inlet in 1982 and I trapped him in Peru in March 1989. He was then resighted at his nest in Canada later that summer. So, for that bird, we now know where he nests and perhaps where he winters each year. We need to track more birds that closely."

The Padre Island survey is only a small part of team member Bud Anderson's work with falcons. He is also director of the Falcon Research Group, a nonprofit organization based in Bow, Washington. He spends most winters in South America tracking Arctic peregrines on their wintering grounds. "There's a loose network of falcon researchers," says Anderson. "We study peregrines in Alaska, Canada, Greenland, South America, and the migration spots in between. We all know each other and keep track of each other's work. Tom Maechtle hires me in the spring and fall to band peregrines on Padre Island and that dovetails nicely with my research in South America."

What is perhaps most remarkable about Maechtle, Anderson, and many of the others is that they are not affiliated with a university or major research institution. They must seek government and private funding independently to carry on their work.

Each morning as dawn breaks over Padre Island, the trappers have already loaded up their All-Terrain-Vehicles (ATVs) and are headed up the beach toward the prime falcon areas. Survey team members often spend more than 12 hours a day driving slowly up and down the island, stopping frequently to scan for falcons. It is a harsh environment, where the trappers may face searing heat, blowing sand, mosquitoes, rain, and a chill Gulf wind, all in the same day. Still, it's an experience that few survey team members can stand to pass up come spring and autumn.

OCTOBER 10 — As I drive my ATV across the broad expanse of tidal flats on the back side of Padre Island, I can't help thinking of a scene from "Lawrence of Arabia." Lawrence and the Bedouins, riding atop huge camels, are trudging across a barren, trackless landscape called "the anvil of the sun," pounded mercilessly by endless shimmering heat. Now I know how they felt. The back side of Padre Island seems almost as remote (and hot) as the Arabian desert. Hard to imagine that only 20 miles south on the developed end of the island high-rise hotels and condos tower above the shifting sands.

Though peregrines are seen just about everywhere on Padre Island—flying along the shore, perched on tall buildings, or sitting on sand dunes—the PIPFS trappers prefer to patrol the huge tidal flats on the landward side of the island, where most of the peregrines gather. An ATV is the only practical vehicle to drive on the flats. Anything else would get stuck immediately in the soft, damp sand. Each ATV is a self-contained mobile trapping station, with portable traps, optical gear, bands, blood sampling equipment, a two-way radio, food, and water—everything needed for a full day of trapping.

Above, Oscar Beingolea (left) and Bud Anderson confer during a trapping run on Padre Island. The ATVs they drive are ideal for crossing the soft sand on the tidal flats. Peregrine falcons such as this adult female, below left, have used Padre Island as a migration staging area for millenia.

OCTOBER 11 — I sit on my ATV scanning the horizon with binoculars. The flats look as lonesome as the moon. A brown object moving at the edge of the dune line catches my eye—a coyote searching for refuse washed ashore. At high tide, water rushes onto these flats, erasing our tire tracks and bringing new objects for coyotes and other beachcombers to scavenge. Looking back toward Laguna Madre I see a nondescript shape on the sand near the water's edge. I can't make out any detail, but the tilt of it, the way it seems to be leaning into the wind, convinces me it is a peregrine. I turn and drive quickly upwind for a better look.

When most people think of a hunting peregrine falcon, they picture the bird hurtling down on its prey from a high altitude. The hunting style on the flats of Padre Island is about as far removed from that image as you can get. Here the falcons usually sit on the sand, or on any available perch—a post, an old crate, or a piece of driftwood—and wait. When potential prey flies over, the falcon takes off from ground level and attempts to intercept it. This is an unusual hunting tactic. Peregrines normally rely on surprise and an altitude advantage to overtake their prey, dropping from a lofty perch or diving down out of a soar. In most situations, a high-flying bird would be long gone before a falcon sitting at ground level could build up enough speed to overtake it. But on the broad tidal flats of Padre Island, the predator-prey relationship shifts to the falcons' advantage.

The tidal flats of Padre Island have served the peregrines for millennia as a vast, open bird trap. Songbirds, shorebirds, waterfowl, and other migrants making the crossing to Padre Island are already exhausted from their long journeys. But before reaching the safety of the dune grass and other vegetation in the middle of the island, they must first cross Laguna Madre and then pass over a wide "no man's land" of flat, barren sand. It is a dangerous crossing for any bird that attempts to run this gauntlet. At times, several falcons will fly out to intercept one bird.

Sometimes the prey is another raptor. On this trip I saw a peregrine dive repeatedly at a tiny sharp-shinned hawk. The smaller bird managed to sidestep the falcon's stoops time after time, and it finally reached cover safely. But Mark Robertson, a long-time PIPFS trapper, recalls seeing a merlin that wasn't so lucky. Half a dozen peregrines chased the smaller falcon back and forth, high over the flats, until it was finally caught.

It is a grim but efficient process. Migrating peregrines must conserve energy and build up fat stores before continuing their own perilous journeys, where they too might face death through starvation, collisions with power lines or vehicles, attack by other predators, or poisoning by toxic chemicals.

OCTOBER 12 — We spot a hatch-year male peregrine perched on a low piece of driftwood at the edge of an inlet. We set out a portable trap for the bird. Before we can even drive away, the falcon and two others start diving at the trap. We set another trap and all three birds work them as we watch. Two birds are down on the traps, then the male tries to fly off and is caught. We move in quickly.

The PIPFS team always splits into two groups during peregrine migrations; one stays in a beach rental on the south island, while the other sets up camp on North Padre Island. The camp is rough—sandy, windblown, and full of mosquitoes at night. Ferrying the ATVs, tents, and other equipment across the channel is always an adventure. To get to North Padre Island, each trapper drives his ATV onto a large plywood board on top of a rubber raft, then floats it carefully across the channel. The crossing can be a hair-raising experience, especially if a powerboat cruises down the channel and kicks up a wake. But so far none of the ATVs (or falcon trappers) has ended up at the bottom of the channel.

The survey crews have developed their falcon trapping techniques to a fine art. They know how to recognize peregrines at extreme distances, how to set up traps quickly, and how to lure in a falcon effectively. But the after-capture work is even more impressive, as the trapper hurries to process the falcon, record data, and release the bird in 15 minutes or less to avoid undue stress. The first step is to slip a leather falconry hood over the peregrine's head (the darkness provided by a hood has a remarkable calming effect on a

This hatch-year male peregrine, far left, will have a blood sample taken, a band attached, his data recorded, and then be released, within 15 minutes of capture. Oscar Beingolea of Peru, above, scans the broad tidal flats for the familiar shape of a peregrine falcon.

The flats look as lonesome as the moon.
At high tide, water erases our tire tracks
and brings new objects for coyotes
and other beachcombers to scavenge.

Each falcon is hooded immediately after capture, above. Falconry hoods have a remarkable calming effect on raptors. Author Tim Gallagher, below, holds a newly trapped female peregrine falcon.

BUD ANDERSON

falcon). Then the bird is taken from the trap and placed in a light cotton straitjacket to hold it steady. Next the trapper bands the falcon, takes a tiny blood sample, and then daubs the bird's breast with a harmless dye. The color mark helps trappers to distinguish an already-caught falcon from a fresh one, to save wasted effort. The dye generally fades away in three or four weeks in the sunlight, rain, and salt spray the birds are exposed to. The falcon is then set free. It's a remarkably smooth, efficient procedure.

OCTOBER 13 — We catch a hatch-year male peregrine at midday. Processing the bird is hell. The day has turned hot and sticky. As we hurry to band the falcon and take a blood sample, the air around us fills with tiny buzzing gnats. They cover our faces, crawling in our eyes and up our noses and ears. The sound is deafening. It is impossible to breath without inhaling them. Our eyes fill with sweat. Finally we finish up, release the bird, and blast down the beach on our ATVs at full speed to blow away the gnats.

Collecting falcon blood samples is an important part of the PIPFS team's work. Researchers hope eventually to be able to pinpoint the area where particular falcons were born by analyzing their DNA. Then if an unbanded peregrine falcon is captured in South America during the winter, a simple blood test could reveal whether the bird was a native of the area or a migrant from Alaska, Canada, or Greenland.

"We also record the levels of toxins that accumulate in the blood of individual falcons," says Maechtle. "We'll look at those samples where we have a falcon, for example, that was caught in 1985 as a hatch-year bird, then caught again in 1987 and 1990, and we'll measure whether the bird's contamination level has increased over time. We get enough retraps on the same birds to make that possible. We may not get them every year, but we often recapture them every third or fourth year."

OCTOBER 14 — We're in the doldrums now. Everyone is hoping for a northern front. The birds ride the storms all the way down from Alaska and northern Canada. The trappers depend on them for a good migration. A strong storm front will flush out the birds that are already here, sending them on their way to South America, and bring in a new batch of unbanded falcons. Many of the ones we see on the flats now are already color marked.

The falcon retrap rate on Padre Island is astounding. In the spring, fully 30 percent of the falcons caught are birds that were previously banded on the island, which shows how faithful birds are to a migration route. "It's not just by chance that we're capturing them here," says Maechtle. "The falcons have as great a fidelity to a staging area as they do to their nesting grounds."

Maechtle believes that this may also be true of the falcons' wintering grounds. Perhaps the birds are on their way to a particular favorite perching area in South America. That's why the work of Maechtle and the others is important: so that prime pieces of falcon wintering ground, as well as staging areas, can be identified and then preserved. Above all, he believes that the research on migrating falcons must continue.

"If we don't continue to monitor peregrine falcons," says Maechtle, "we could easily slip back into the same scenario we faced in the 1960s when the birds' population crashed. Only by keeping track of the birds' numbers and continually analyzing the level of toxins in their blood can we avoid that."

OCTOBER 16 — While I'm standing in front of the hotel waiting for the shuttle bus that will take me to Harlingen Airport, a female peregrine comes ripping over the top of a nearby high-rise hotel. She turns over and makes a vertical dive into the small field of dune grass between the two buildings. Through my binoculars I can see her stoop repeatedly at a small bird. Each time the bird sidesteps her attack, the falcon pulls out of the dive and lets her momentum carry her almost back to her former altitude. Finally, the small bird gets safely into some shrubbery that surrounds the hotel. The falcon barely misses slamming into the side of the building as she pulls up. She lands on the hotel roof and starts preening her flight feathers. Suddenly I'm aware of a van parked next to me with its driver honking the horn. I take a final look at the falcon, still perched on the hotel, as we drive away to the airport. ■

SPECIAL PULLOUT SECTION

BIRDSCOPE

The newsletter of the Cornell Laboratory of Ornithology ■ *Volume 6, Number 3* ■ *Summer 1992*

TIM GALLAGHER

Volunteers for Ornithology: The Next Generation

Rick Bonney

New grant will encourage public participation in ornithology research

Encouraging and supporting volunteer participation in ornithological research is one of the main objectives of the Lab of Ornithology. Therefore, we are delighted to announce the receipt of a National Science Foundation (NSF) grant to improve our abilities to involve the public in scientific investigation. Called "Public Participation in Ornithology: An Introduction to Environmental Research," the grant will provide $759,269 over the next three years to evaluate and improve our radio program, BirdWatch; to evaluate and improve Project FeederWatch; and most exciting of all, to develop a brand-new educational program called the National Science Experiment, which is modeled on FeederWatch.

The new grant comes from the NSF informal science education program, which supports projects that involve broadcasting, science museums, nature centers, science clubs, and other community-centered activities. Of particular interest to this program are opportunities for both children and adults to acquire science literacy and awareness while satisfying natural curiosity. The National Science Experiment should fill the bill nicely.

The idea for the National Science Experiment grew out of months of discussion among the grant's three principal investigators: Charlie Walcott, executive director of the Lab; Rick Bonney, director of education and information services, and Greg Butcher, director of bird population studies. Walcott, an expert in informal science education, had been pondering national concern for both the poor condition of science education and the effects of humans on the environment. One approach for addressing both concerns simultaneously, he mused, was to provide the public with the opportunity to participate in real environmental research. With this approach the Lab could achieve two ends: it could teach people how science is conducted, thereby increasing their understanding of science, and it could promote public awareness of environmental issues.

Ornithology lends itself well to this concept. First, a large percentage of the public is seriously interested in birds. According to the U.S. Fish and Wildlife Service, 84 million Americans feed birds each year. That's approximately one out of every four people in the country. Second, public participation in ornithology is welcomed by professionals in the field, because many important projects could not be accomplished without massive volunteer help. Finally, people who become excited about birds and get involved in data-collection projects typically become interested in more general environmental issues. Curiosity about birds usually leads to numerous questions: Where do birds live? What do they eat? Why are more (or fewer)

The Fuertes Directorship: An Endowment Built on Friendship

The Lab of Ornithology announces the Louis Agassiz Fuertes Directorship, a new endowment in support of the Lab's executive director. This directorship was made possible by a lead gift from Imogene Johnson, longtime Lab friend and administrative board member. Imogene's generosity inspired gifts from several other Lab friends and a group of anonymous Cornell friends who together have fully funded this $3 million endowment.

The directorship is named in honor of Louis Agassiz Fuertes, the preeminent bird artist whose superb works are on permanent display at the Lab. This endowment is the second milestone in the Lab's capital campaign—the first was the Edwin H. Morgens Profesor of Ornithology, which was announced just this past March.

The Fuertes Directorship is born out of family friendship. Imogene's grandfather-in-law, Professor Olaf Brauner, was a landscape artist and one of Fuertes's teachers. Fuertes took the Brauner family birding, encouraging them to bring sketch pads and teaching them song identification skills. Thus began a lasting friendship between the Fuertes, Brauner, and Johnson families. According to Imogene, "Louis was a great man in his enthusiasm for everything he did. He loved birds and animals. He had many, many friends, an infectious sense of humor, and a wonderful way with children."

We extend our thanks to Imogene Johnson, her family, and the many other Lab friends who have made the Louis Agassiz Fuertes Directorship a reality. What started as a friendship has culminated in a celebrated and enduring leadership position for the Lab.

Scott Sutcliffe

Scott Sutcliffe, General Director

birds visiting our feeder this year than last? Answers to such questions quickly lead bird watchers deep into the thickets of concern about conservation and the environment.

The actual National Science Experiment, devised by Butcher and Bonney with help from the Lab's administrative board, will involve bird watchers throughout the country. Participants will engage in a series of guided activities aimed at answering specific questions about ornithology and also teaching scientific methodology. The first three questions most likely will be 1) do ground-feeding birds exhibit regional preferences in foods at feeders?, 2)in what months do rock doves (pigeons) living in cities breed, and which months are the most productive?, and 3) what is the smallest size of forest fragment in which each of the tanager species can breed?

The National Science Experiment is the next logical step in a long tradition of amateur involvement

These questions were selected because they represent a range of activities that can be undertaken by diverse audiences, from those with simple bird-watching skills to those having the more complex knowledge required to recognize birds by their vocalizations; because they involve activities that can be undertaken both in the city and the country, during both winter and summer; and because they are questions for which clear answers should result from a single season of investigation. In addition, the tanager habitat project should provide data relevant to neotropical migratory bird conservation (see "Save Now or Pay Later" in the Summer 1992 issue of *Living Bird*).

Participants in each of the experiments will include members of bird clubs, nature clubs, urban groups, scout groups, 4-H clubs, and the like. Organizations that have already agreed to cooperate include the National Audubon Society, National Wildlife Federation, American Birding Association, Roger Tory Peterson Institute, Wisconsin Society for Ornithology, New Jersey Audubon Society, Cornell Cooperative Extension of New York City, and the American Association for the Advancement of Science. The two latter organizations should be particularly helpful in inaugurating our pigeon-watching project in cities, where few environmental education programs have ever been attempted. In addition, the U.S. Forest Service and the U.S. Fish and Wildlife Service have agreed to help us perform the tanager experiment on public lands.

The National Science Experiment will be conducted in stages. During the first year, we will bring together leaders of cooperating organizations to develop prototype experimentation methods. We will also test the experiments with small groups of observers and modify the experimental design based on the field trials. During the second year, we will run the experiment with all interested participants. In the third year we will analyze the results, report back to the participants, and evaluate the project to determine its success and to decide whether we should continue the experiment with new scientific questions.

Evaluation will proceed along two fronts. First, we will measure the number of participants to see whether such an effort can attract a wide audience. Second, we will survey a sample of the audience to determine the effects of participation. Will participants change their perceptions of both science and ornithology? Will involvement in research have a stronger effect on the participants than, for example, passive viewing of an educational program or exhibit, and if so, in what ways?

Walcott, Bonney, and Butcher feel that the National Science Experiment is the next logical step in a long and valuable tradition of amateur contributions to the science of ornithology. We hope that all interested individuals and organizations will join us as we embark upon this unique project.

BILL DYER

BPS Gets Tanager Grant

The Lab's Bird Population Studies program (BPS) has been awarded a grant from the National Fish and Wildlife Foundation for an innovative survey of tanagers in North America. Called "Tanagers in Forest Fragments," the project is part of the Partners in Flight Neotropical Migratory Bird Conservation Initiative. Grant funds will supplement the Lab's award from the National Science Foundation (above) for three National Science Experiments.

BPS will call on the expertise of bird club members across the country in an effort to monitor four species of tanagers—scarlet, hepatic, summer, and western—during the breeding season. "These tanagers are neotropical migrants," says BPS director Greg Butcher, "and other studies have shown that scarlet tanagers are sensitive to forest fragmentation. Furthermore, a recent analysis of Breeding Bird Survey data shows scarlet tanager numbers have declined significantly over the past 10 years. We think forest fragmentation is the problem, and we predict that all four species of tanagers are much more likely to breed in large forests—say 1,000 hectares or more—than in smaller forests." A small army of citizen birders—Butcher hopes to enlist at least two bird clubs in each of the lower 48 states—will test this hypothesis.

The project will also call on a variety of agencies and organizations that are involved with Partners in Flight, including the U.S. Forest Service, state parks and forests, The Nature Conservancy, the forest products industry, and others, to identify forest fragments of various sizes. The $110,000, one-year grant consists of a $45,000 award and $65,000 in challenge funds. "We'll be looking for corporate and foundation support," says Butcher, "and we expect this will ultimately be a three-year project." Other Lab departments will assist BPS in producing a tape of tanager vocalizations, a tanager identification poster, and other educational aids for project participants.

Butcher says BPS originally considered wood pewees as the subject of this study. Why did they go with tanagers? "One of the four tanager species breeds in each of the lower 48 states, so everybody lives pretty close to a breeding tanager," says Butcher. "Besides, they're so colorful."—*C.B.*

TIM GALLAGHER

Profile: Scott Sutcliffe

When Scott Sutcliffe was 6 years old, his grandfather gave him a copy of the Cornell Lab of Ornithology's first bird song record, *Songbirds of America.* "I was already a bird enthusiast, so it was a great present," Scott remembers. "Right then and there I promised myself, 'I'm going to go to Cornell University, where they made that.'"

A few years have gone by, and Scott's wish has come true . . . twice! How did it happen?

"In high school I was more interested in cars than birds," he admits. "But one day, my parents dragged me away from the Volkswagen bug I was rebuilding and took me to Manomet Bird Observatory, where they'd been volunteers. I got hooked. I was Manomet's first student intern."

From there, Scott earned a B.S. in wildlife ecology at Cornell (the first granting of his childhood wish), then went off to watch loons for the summer on behalf of the Squam Lakes Association. That summer job inspired him to enroll at the University of New Hampshire, in the Institute of Natural and Environmental Resources, where he earned a master's degree in "loon-ology." "I was the only nongame bird person in the whole institute," Scott says, "but I converted them."

While attending UNH, Scott headed the Loon Preservation Committee of the Audubon Society of New Hampshire, a volunteer-based loon survey and recovery program. At the same time, he helped found the North American Loon Fund, a membership organization that promotes loon preservation by funding research, education, and management programs.

"We called ourselves the loon rangers," says Scott of his Audubon work. "We'd go 'dock-knocking,' teaching the people who lived on the lakes, in a friendly way, what they could do to help their loons. And our program really worked. From 1975 to 1990, the number of adult loons in New Hampshire more than doubled."

But despite the satisfactions of his loon-atic lifestyle, Scott decided he needed a change. So he took a job as director of the Long Island chapter of The Nature Conservancy (TNC). "It was culture shock: moving from New Hampshire to Long Island. But I loved the work, because I really support TNC's goals: to identify, protect, and manage critical habitats."

Fate, however, hadn't yet completely fulfilled its plans for Scott Sutcliffe. In 1985, the Lab of Ornithology recruited him away from TNC to come to Sapsucker Woods as director of public affairs. So he came to Cornell—again.

Even though the job initially had some disadvantages—his first office was in a converted hallway—Scott was impressed by the professionalism of the Lab staff and the potential for growth. In 1991, Scott became the Lab's general director.

"The best thing that's happened since I came to the Lab," says Scott, "is the work we've done to focus our mission: who we are and what we want to accomplish in bird study and conservation. We have a talented and dedicated staff and an excellent board of directors—it's great working with them."

His vision for the future? "I'd like the Lab to be the premier bird institute in North America. Any time anyone sees a bird, anywhere, I want them to think 'Cornell Lab of Ornithology—providing the tools for bird research and conservation.'"

Even though the license plate on Scott's car (it's a Volkswagen, by the way) still reads "LOONS," and even though a hand-carved loon graces the comfortable office he now occupies, Scott says they're not his favorite bird. "Loons are a touchstone," he explains. "They're mysterious, they're beautiful, and they symbolize the wilderness they inhabit. Get people excited about loons, and they'll want to protect the lakes that loons depend on.

"It's the same way with birds in general, only we're looking at the big picture. If we care about birds, we'll protect all the resources birds rely on—and ultimately our planet." —*C. B.*

Big BirdWatch '92: A Record-Shattering Day for the Sapsuckers

The Sapsuckers returned from New Jersey's World Series of Birding last month with some amazing news: not only did they log in 184 bird species in 24 hours, shattering the all-time Sapsucker big day record by 11 birds, but they also raised more money than anyone had even remotely imagined. Over $48,000 has been raised to date, all from the dimes, quarters, and dollars pledged by our members and friends.

How did the Sapsuckers improve their score? Mostly by spending a lot more time scouting New Jersey before the event than they had in previous years. A full two weeks before the event, Cornell grad student Ned Brinkley was already there, checking key areas and camping out in places with night bird activity. The rest of the team—Tim Gallagher, Todd Culver, Kevin McGowan, and Ken Rosenberg—joined Ned a week later and spent the next five days birding from 5:00 A.M. to midnight.

The big day plan seemed so simple; but who could have predicted that a storm would hit the day of the event. Daybreak found the Sapsuckers standing in a driving rain in the middle of a marsh. But worse was to come: At Brigantine an afternoon fog obscured many birds. Still, the Sapsuckers hung tough and though they didn't win the World Series of Birding, they achieved a score to be proud of.

We'd like to thank all of you who supported Big BirdWatch '92 through your pledges and made the event such a success. And also a special thanks to Ford Motors, who lent the Sapsuckers a four-wheel-drive Explorer to drive in the event.

TIM GALLAGHER

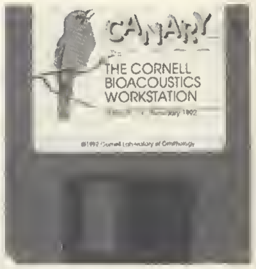
The Sapsuckers in action on Big BirdWatch Saturday.

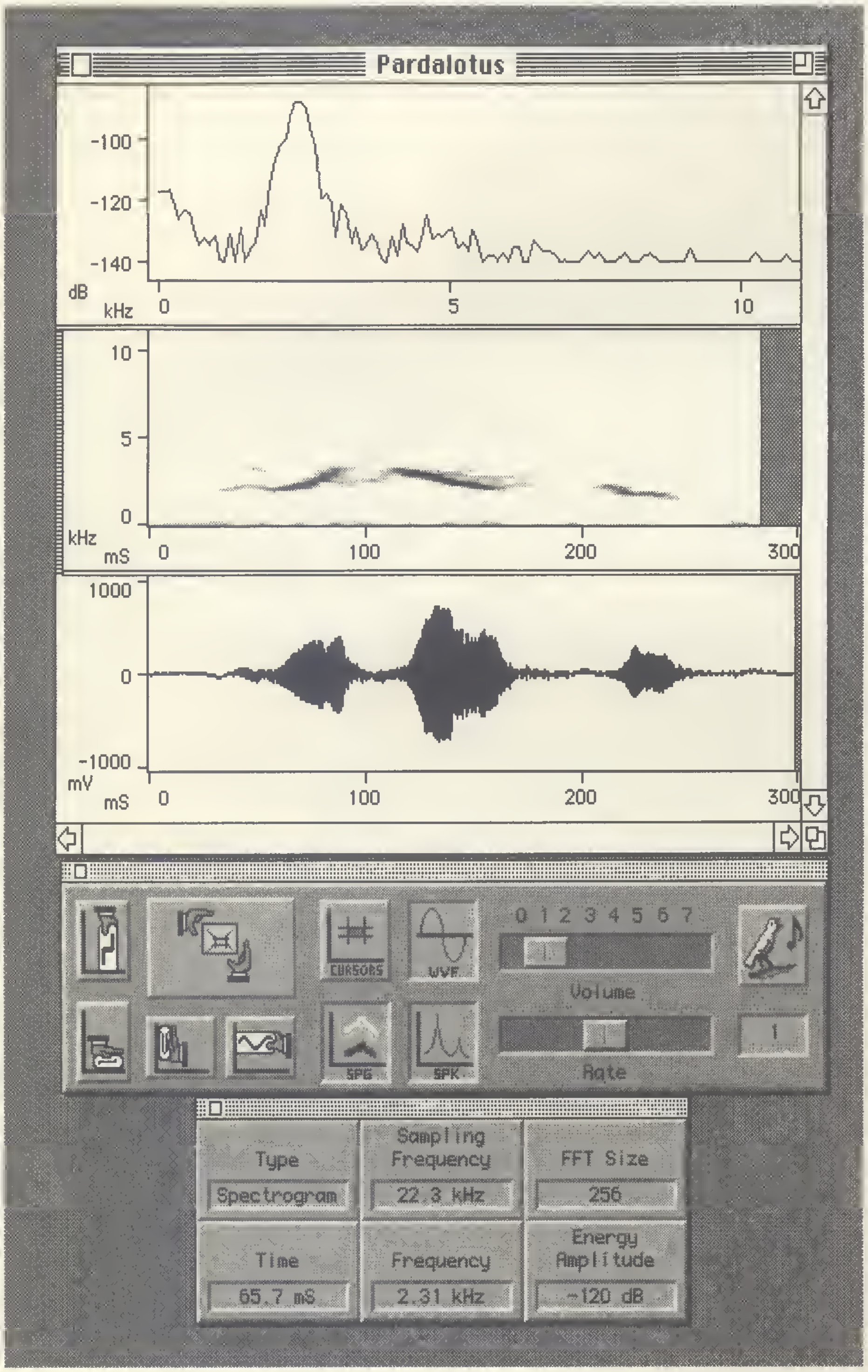
The Canary Sings!

It's a Bird . . . It's a Disk . . . It's New Sound Analysis Software

The Lab's Bioacoustics Research Program (BRP) has released a new computer software program for analyzing natural sounds. Called "Canary," the Macintosh-compatible program transforms recorded sounds into data files that can be displayed as spectrograms, then edited, compared, and interpreted. The development of Canary was funded by an $82,000 National Science Foundation grant and matching funds raised by the Lab.

"The bioacoustics research community has a real need for a sound analysis program that's user friendly but also has sophisticated analytical capabilities," says BRP director Christopher Clark. "Canary is both, and it runs on a moderately priced computer system that many researchers already have in their labs."





Type	Sampling Frequency	FFT Size
Spectrogram	22.3 kHz	256
Time	Frequency	Energy Amplitude
65.7 mS	2.31 kHz	-120 dB

Making sense of sounds: Canary displays three aspects of this Australian bird's song simultaneously.

According to Clark, most of the sound analysis systems now in use have been adapted from industrial or medical applications. "Bioacousticians have been forced to analyze animal sounds using less than optimum parameters," he says, "simply because that's how these instruments are set up—to measure the human voice or the sound of worn-out ball-bearings." Canary has a whole continuum of settings available, so researchers can tailor each analysis for the sound spectrum of the animal being studied.

BRP programmer Steve Mitchell, who wrote the program, demonstrated Canary's capabilities for Lab staffers at a recent meeting. First recorded sounds are converted to data files; then the computer screen displays a window with as many as three sections that show a sound's waveform, spectrogram, or spectrum. A command panel controls the display scale and playback volume, while a measurement panel lets the researcher quantify parameters of the sound. Two sounds can be viewed and compared simultaneously.

Researchers can put Canary to work in their labs for a small fee. The $200 purchase price covers future upgrades, including a user manual, on-line help, and tutorials. "That's our immediate next project," says Clark, "developing these materials to make the program even easier to use." BRP is also planning an advanced version of the program for the Cornell bioacoustics research community.

Erratum

The photograph of Greg Budney on page 2 of the Spring 1992 issue of *Birdscope* was credited incorrectly. The photographer's name is Robert I. Bowman.

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The Golden-cheek and the Ghost Subdivision

by Mel White

As housing developments go belly up in the Texas Hill Country, a threatened warbler gets a reprieve

I've lived in Arkansas my whole life, but since I started birding my second home has been the quasi-independent nation-state of Texas, which sprawls just on the yonder side of Texarkana and which, in a happy convergence of biology and psychology, is as full of birds as it is of itself. If I manage to be on the road around daybreak, by midafternoon I can be watching black skimmers incise a Gulf Coast bay, or scanning a marsh for roseate spoonbills. A cheap airline ticket quickly puts me at the Harlingen airport, a few minutes from green jays and blue buntings. These are tempting possibilities when a holiday weekend approaches.

As most birders do, I've concentrated on the fringes of the state: the coast, the lower Rio Grande Valley, and the Big Bend. Until recently I'd never spent any time in the Texas Hill Country west of Austin and San Antonio. This meant that I'd never seen a golden-cheeked warbler, since the Hill Country is the only place in the world where it breeds. (Neither had I been to the mountains of Central America to see it on its wintering grounds.) Last spring I had a chance to visit the Austin area, and it seemed an appropriate, if gloomy, time to make this little bird's acquaintance. In 1989, the U.S. Fish and Wildlife Service, in a special emergency ruling, declared the golden-cheek an endangered species.

Golden-cheeked warblers require a very specific habitat: hilly country with mixed woodland that includes mature Ashe juniper trees. The birds use strips of bark from the juniper (which most Texans call "cedar") in their nests. Unfortunately for the golden-cheek, our own species finds the Hill Country appealing, too. The rolling landscape west of the Balcones Fault, which separates the hills from the Gulf Coastal Plain of east Texas, has a rough beauty that attracts resorts and retirement communities. Hill Country rivers like the Guadalupe and the Colorado have been dammed, creating popular recreational lakes but flooding habitat. Land-clearing for agriculture and ranching has destroyed extensive

ILLUSTRATIONS BY JOHN SCHMITT

areas of native woodland. In addition, Austin was one of the country's true boom towns in the early 1980s; the success of high-tech industries created phenomenal growth, much of which took place in the hills to the west of town—important golden-cheek habitat.

No one knows exactly how many golden-cheeked warblers are left; estimates vary from 4,000 to 15,000 breeding pairs. What is known is the extent of habitat destruction: in the past decade alone, 40 percent of the land suitable for golden-cheeks has been lost in the heart of their range. Equally ominous, most of the remaining habitat is in counties that are becoming urbanized. The golden-cheek, with a true claim to being a native Texan, is in danger of finding itself without a home.

It didn't take long, once I was in the Hill Country, to find a graphic example of the problems facing the golden-cheeked warbler. Late one Saturday in March I left Interstate 35 north of Austin and drove south on Highway 620, which skirts the city to the west. On the map, 620 looked like a country road, but it turned out to be a four-lane freeway lined with subdivisions, all of obviously recent origin and many in what looked to me like good oak-juniper woods. And then something else become obvious: for every subdivision or "business park" up and running, another had stalled on the starting line. There would be a fancy entrance gate with a logo—something like "Timberforest Woods" or "Mountainhill Ridge"—with a steel cable across the entry and weeds growing up through the driveway. And—oh, yes—a "For Sale" sign.

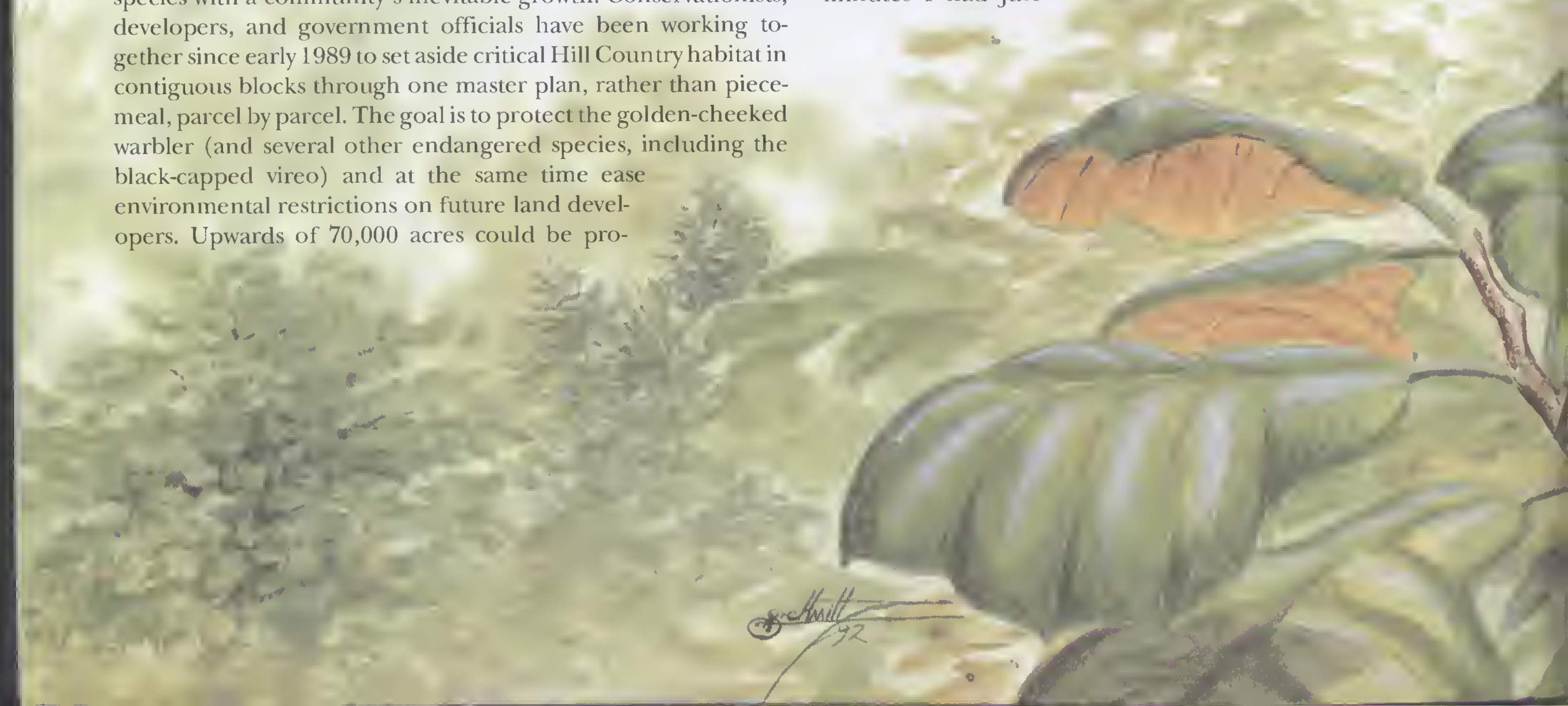
What I was seeing was a true interface between money and the environment. Back when Austin was booming, high-rolling developers wore blisters on their fingers signing loans and playing "Let's Make a Deal" with other people's money. When the real-estate bubble burst, a lot of people were left with "luxury homesites" that nobody wanted. Multiply this a few hundred times, and Texas savings-and-loans starting going belly up faster than dime-store guppies. (And quite a few people who drove Porsches and wore $1,200 suits moved into what they call down here the crossbar hotel.) Bottom line, Austin isn't growing anymore and the golden-cheeked warbler has something of a temporary reprieve.

Which brings us to the Balcones Canyonlands Conservation Plan, a historic attempt to reconcile the needs of endangered species with a community's inevitable growth. Conservationists, developers, and government officials have been working together since early 1989 to set aside critical Hill Country habitat in contiguous blocks through one master plan, rather than piecemeal, parcel by parcel. The goal is to protect the golden-cheeked warbler (and several other endangered species, including the black-capped vireo) and at the same time ease environmental restrictions on future land developers. Upwards of 70,000 acres could be protected under such an agreement, much of which would be included in a new refuge called the Balcones Canyonlands National Wildlife Refuge northwest of Austin. It has been a long, hard process of conflict and compromise, but if a habitat plan is approved by all the participating agencies, it could set an important precedent for dealing with issues of development and preservation.

If the conservation plan succeeds, it may be in part because a good deal of important habitat is now owned by the federal government—more specifically, by the Federal Deposit Insurance Corporation (FDIC) and the Resolution Trust Corporation (RTC). These agencies took over land from failed financial institutions, and, in one important way, they have an incentive to cooperate by seeing some of that land set aside for wildlife. If a habitat plan is put into place, development outside conservation areas will be much easier, making land worth more and increasing the value of the remaining FDIC and RTC holdings. Thanks to the massive scale of bank and savings-and-loan failures, there's plenty to work with; at one point after the bust an Austin newspaper reported that as much as seven percent of Travis County (Austin's home county) was owned by either the FDIC or RTC. Serious negotiations are already under way for The Nature Conservancy to buy 9,600 acres of RTC land.

After I'd been on Highway 620 for some time, and after passing innumerable developments both active and defunct, I decided to do a little exploring. Choosing more or less at random, I turned off the highway onto a woods-lined road heading west, and then parked. This was a broad new street, paved and curbed; cleared corridors with flagged wooden stakes branched off from each side. Obviously these were intended to be secondary streets, but they led nowhere. Weeds and scrub choked the rights-of-way. A Bewick's wren sang. The wind rustled the trees. A "black-crested" titmouse scolded, and a scrub jay popped up to see what was going on. Green Acres.

I walked down one of the cleared paths, which paralleled a steep, wooded ravine. I didn't know exactly where I was going, but this habitat looked good; it certainly had plenty of junipers mixed with the oaks. A black-and-white warbler sang from somewhere off the road, but not much else was active. After 20 minutes I had just



about decided that it was too cloudy, too late in the day, when I heard a distant buzzy song that sounded a little like a black-throated green warbler—just what I'd been listening for. I kept going down the path.

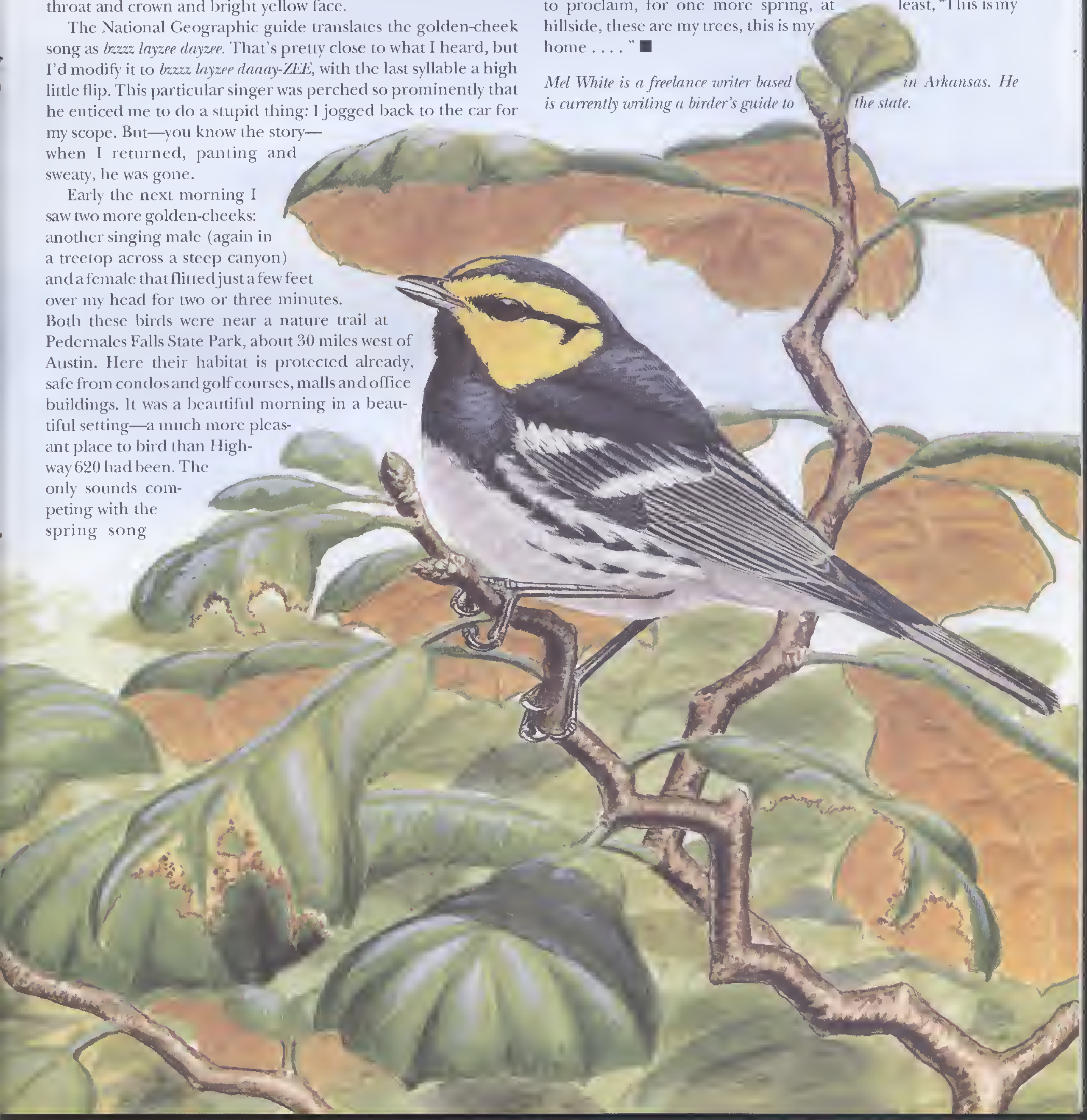
The song repeated at frustratingly long intervals, but eventually I homed in. If it was a golden-cheek, it was right where it ought to be, on the edge of a rugged, tree-filled canyon. Unfortunately, I was on the wrong side. I considered my options, then tried the birder's desperation maneuver: I started scanning with my binoculars. And I found him. He was claiming his territory from the top of a tree at eye level across the ravine, just about at the limit of binocular recognition. Nonetheless, I could see his black throat and crown and bright yellow face.

The National Geographic guide translates the golden-cheek song as *bzzzz layzee dayzee.* That's pretty close to what I heard, but I'd modify it to *bzzzz layzee daaay-ZEE,* with the last syllable a high little flip. This particular singer was perched so prominently that he enticed me to do a stupid thing: I jogged back to the car for my scope. But—you know the story—when I returned, panting and sweaty, he was gone.

Early the next morning I saw two more golden-cheeks: another singing male (again in a treetop across a steep canyon) and a female that flitted just a few feet over my head for two or three minutes. Both these birds were near a nature trail at Pedernales Falls State Park, about 30 miles west of Austin. Here their habitat is protected already, safe from condos and golf courses, malls and office buildings. It was a beautiful morning in a beautiful setting—a much more pleasant place to bird than Highway 620 had been. The only sounds competing with the spring song were the rush of the Pedernales River and the splash of a small waterfall on the creek below me.

To tell the truth, though, I'm glad I saw my first golden-cheeked warbler where I did. I have no idea whether his suburban canyon will ever be preserved; someday, one of his descendants may return from its wintering grounds in Central America and find bulldozers at work again. But I'll always remember walking down that abandoned road and hearing him singing from a treetop, a symbol of . . . well, of a great many things, including the Texas conservationists fighting for him and his kind. With so many battles for habitat going on all over the world—and so many being lost—it's good to think of this tiny bird able to proclaim, for one more spring, at least, "This is my hillside, these are my trees, this is my home . . . . " ■

Mel White is a freelance writer based in Arkansas. He is currently writing a birder's guide to the state.



JOHN ALCOCK

The Birds and the Damselflies

by *John Alcock*

Comparing birds with insects is one way to learn the facts of life

An Abert's towhee bounces nonchalanly onto our back patio and takes three hops forward. Its partner promppromptly mimics its actions, jumping up onto the patio and skipping close to the the lead bird with three hops of its own. The first towhee then scampers ahead, stopping to send the leaf litter flying by the edge of the patio. The second bird immediately follows suit, joining its companion for a brief bout of foraging. Soon the first towhee stops and flutters on brown wings into a tangerine tree, with the other bird right behind, as if it were physically attached to its partner.

It is the breeding season for Abert's towhees in central Arizona, and the pair on our patio has just built a nest nearby. They are now inseparable, moving everywhere in tandem, exhibiting mutual "devotion" reminiscent of a pair of mute swans cruising sedately shoulder-to-shoulder across an English pond.

In attempting to account for the exceptionally close partnerships found in pair-bonded Abert's towhees, mute swans, and breeding birds generally, students of animal behavior had reached a consensus by the 1960s and 70s. The prevailing view then was that close interactions between male and female promoted synchrony in their physiology and behavior, enabling them to cooperate efficiently as a monogamous duo in producing and rearing young.

This idea, however, has been challenged recently by proponents of a considerably more Machiavellian hypothesis. The new argument is that pairs are inseparable because the male is keeping an eye on his partner, the better to prevent her from copulating with some other male. Far from viewing close associations between male and female birds as a mechanism for reproductive cooperation between the sexes, the new hypothesis suggests that a male remains at his partner's side to shield her from rival males and, if this fails, to be in position to quickly remove or dilute sperm that she receives from other males. These actions help the male to fertilize more of his potentially "unfaithful" partner's eggs.

This hypothesis draws strength from an avalanche of studies in the past decade that document "infidelity" in what were once thought to be faithfully monogamous birds. For example, the new technique of DNA fingerprinting has established beyond doubt that female purple martins, zebra finches, and indigo buntings (to name a few) regularly produce broods that have more than one father (see "When Monogamy Isn't," Summer 1990).

Thus the current school of thought among ornithologists is that male behavior in many species is designed primarily to protect the male's paternity. The mate-guarding hypothesis can be tested in a variety of ways. If it is true, then we can predict that male birds will remain in particularly close company with their partners during that time when their mates are producing eggs that can be fertilized. This prediction has been tested by Stephen Emlen and Peter Wrege of Cornell University in their studies of the white-fronted bee-eater, an African species that forms large nesting colonies in exposed clay or sand banks. At the nesting sites, gravid females can be easily detected by dozens of males, some of which are prepared to race after these females, attempting to force them to copulate—attempts that are occasionally successful. But during the week or so when a female's eggs can be fertilized, her male partner almost invariably flies after her whenever she leaves the nest tunnel. When rival males swoop down to try to knock the female to the ground, her partner is there to intercept his opponents in an aerial dogfight that usually enables his female to avoid an extra-pair copulation (or EPC, as it is known to acronym enthusiasts).

As soon as their female partners have no more eggs to lay, however, the very males that have been accompanying their mates everywhere often begin to pursue other females that still have fertilizable ova. Thus, bee-eater males are both devoted monogamists (when there is a large reproductive payoff from monopolizing the chance to fertilize the eggs of a partner) and opportunistic polygamists (when it is convenient to try to secure some extra egg fertilizations outside the pair bond).

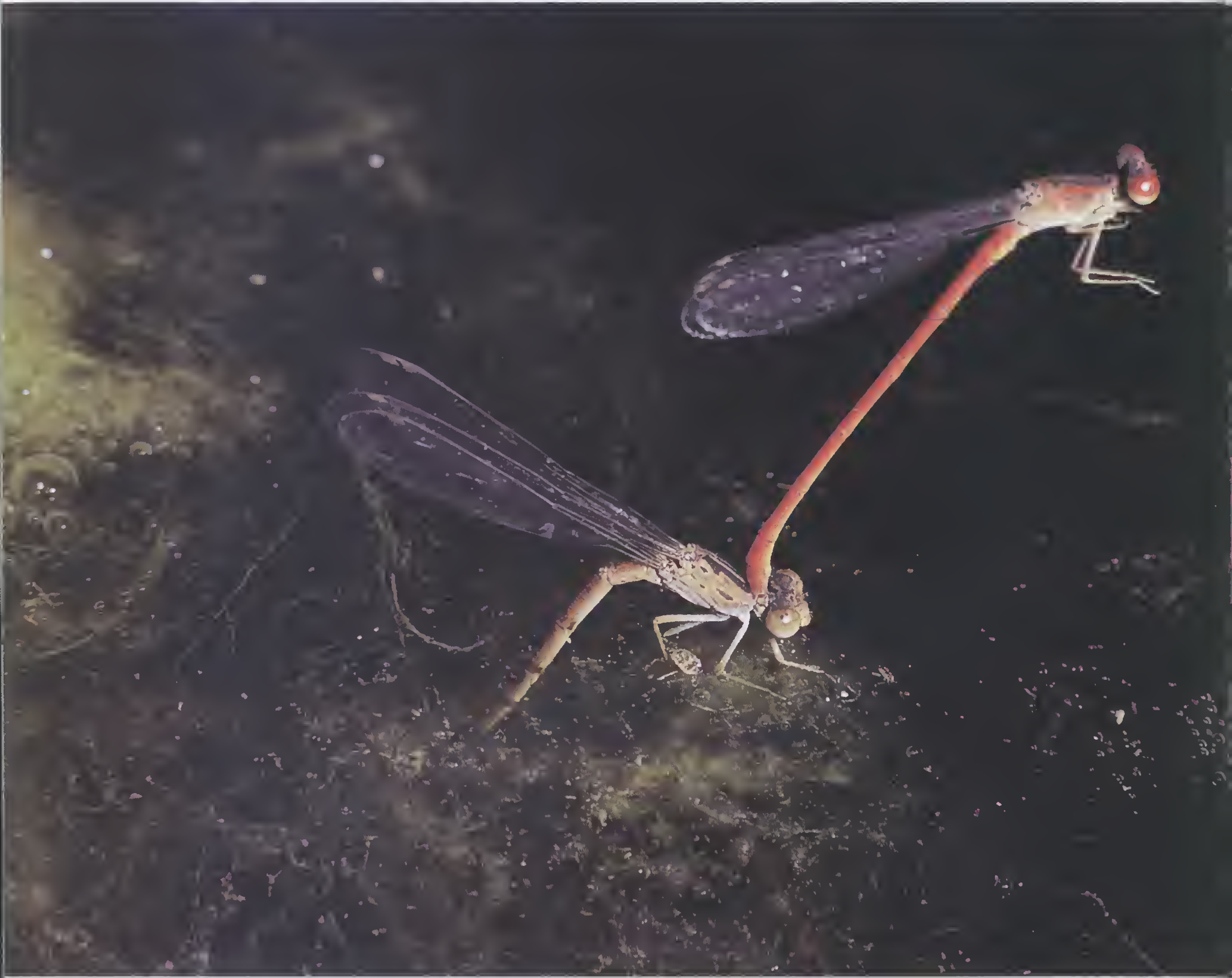
The behavior of male white-fronted bee-eaters (and many other birds) is highly consistent with the mate-guarding hypothesis. But before we conclude that the hypothesis is definitely correct, let's double-check its validity in a way that takes us out of the realm of birds and into the world of insects. If the adaptive value of a close association between the sexes is to permit the male to monitor his mate's behavior and repel rival males, then the behavior should have evolved independently in animals unrelated to birds, *if* females of these other animals also sometimes mate with more than one partner.

Bird watchers can examine this proposition for themselves with little difficulty and much pleasure provided they are willing to set aside their binoculars and expand their observational horizons to include damselflies and dragonflies. These delightful insects have many parallels with birds. Not only are they colorful, visually oriented creatures, but their lives are consumed with sexual competition, competition that can be readily observed in most neighborhoods at a nearby stream or pond.

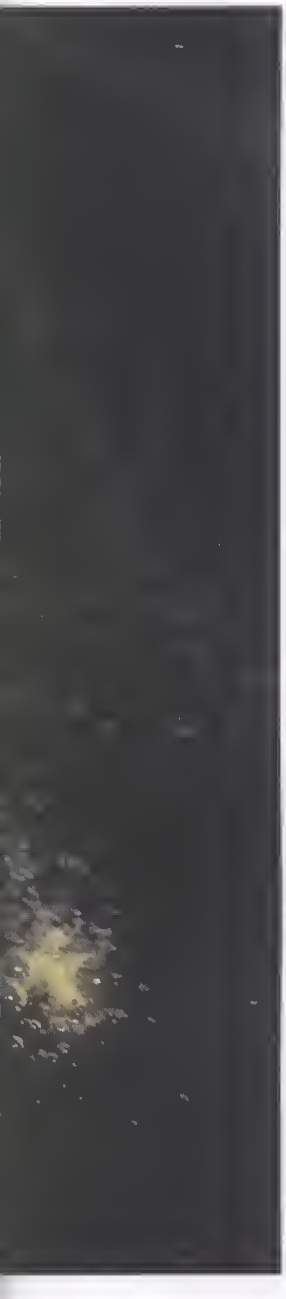
Thus, it is not necessary to travel to Kenya and find a colony of white-fronted bee-eaters (although few would object to such an excursion) in order to enjoy the drama of males competing to fertilize

Why does a male bird follow his mate everywhere? Is it to guard the female from the sexual advances of other males? Entomologist John Alcock invites birders to test this hypothesis by examining similar behavior in a group of insects—the damselflies. At left, male and female black-winged damselflies copulate in the characteristic "wheel" position.

JOHN ALCOCK(2)



Abert's towhee (above right), is just one of many species in which mate-guarding occurs. At left, a male black-winged damselfly guards his egg-laying partners from intruders. If another male succeeds in copulating a the female, the first male will extract some of the rival's sperm, then copulate with his mate again to dilute any sperm remaining. Above, the ultimate in mate guarding: this male damselfly hangs on while the female lays her eggs.



JOHN H. HOFFMAN

the same female's eggs. Consider the black-winged damselfly, *Calopteryx maculata*, a species distributed throughout eastern North America. The males of this gorgeous insect can be found perched at intervals along many small streams and brooks in the Northeast. There they guard territories from rivals and wait for females to appear at the stream to lay their eggs in vegetation barely submerged in water.

Before they oviposit, gravid females are almost always spotted by resident territory holders, which fly to them for a brief courtship and mating on stream bank vegetation. Copulation takes place in the peculiar fashion of dragonflies and damselflies. In this order of insects, the male transfers sperm from his testes at the tip of his abdomen to a "penis" equivalent called an aedeagus, which is located on the underside of his abdomen near his thorax. When the male grasps the female near her head with special claspers on the end of his abdomen, she must swing the tip of her abdomen around to reach the male's aedeagus, forming the characteristic "wheel" position made by copulating dragonflies and damselflies.

After copulation is complete, the male releases the female and she flies to the water to begin laying her eggs. Although the male black-winged damselfly is no longer in physical contact with his mate, he perches close by, keeping her very much in view. When an intruder male approaches—a frequent occurrence in many populations—the resident male darts off his perch. In a brilliant demonstration of aerial maneuverability, he weaves back and forth between the rival and his egg-laying partner, attempting to force the other male away in a fashion rather like male white-fronted bee-eaters.

If male black-winged damselflies are in fact engaged in adaptive mate-guarding, then it follows that unguarded females must sometimes copulate with a male other than their current partner. And they do. On occasion, particularly when a territorial male is simultaneously guarding several egg-laying mates, a group of intruder males launches a combined assault. While the resident chases one rival away, others chivvy ovipositing females up into the streamside vegetation. The females mate with the interlopers before returning to lay more eggs. Much the same thing occurs on occasion in white-fronted bee-eaters: groups of males overcome the defenses of a guarding male, driving the female to the ground. There she may be pounced upon and mated by one or more of her pursuers, apparently against her will. In both bee-eater and damselfly, the presence of a guarding partner reduces, but does not completely eliminate, the possibility that their mates will experience presumably unwanted EPCs.

Therefore, in some birds and some insects, a male may secure a partner that has copulated with rival males. Under these circumstances, the male that could prevent his mate from using the other males' sperm to fertilize her eggs would seem to enjoy a reproductive advantage. But how could this happen once an EPC has occurred?

Studies of the European dunnock by the British ornithologist Nicholas Davies and his colleagues have generated some exciting discoveries on this front. Davies began to investigate the behavior of this extremely drab, sparrow-like bird some years ago, at a time when it was thought to be a typical monogamous bird. In fact, the dunnock's apparent ordinariness was specially singled out for praise by the Reverend F.O. Morris in 1856: "Unobtrusive, quiet and retiring, without being shy, humble and homely in its deportment and habit, sober and unpretending in its dress, while still neat and graceful, the dunnock exhibits a pattern which many of a higher grade might imitate . . . ." As Davies points out, it is just as well that the good reverend did not know about the sexual shenanigans of many dunnocks.

Careful observation of color-banded birds revealed, for example, that some pair-bonded females develop a voluntary sexual relationship with a second male. This male is cautiously co-resident on the female's territory with a dominant (or alpha) male, which often attacks the second (beta) male. Even so, the beta male regularly attempts to copulate with the female, and he sometimes succeeds, particularly when the alpha male happens to lose track of his partner temporarily. Under these circumstances, the female usually makes no effort to assist the alpha male as he searches for her ("frantically," according to Davies) but instead copulates with the beta male.

Although the dunnock (above) was admired by a 19th-century clergyman for its sober, retiring deportment, the bird's true story is rather more racy. If a male loses track of his mate temporarily, she will cooperatively copulate with another partner. Can the first male do anything about it? Yes—he uses the same strategies as a male damselfly, sperm extraction and sperm dilution.

Given that the female may have acquired sperm from his rival, can the alpha male do anything about it? The answer appears to be yes. When an alpha male of the not-so-humble dunnock discovers a beta male in flagrante delicto with their mutual partner, he typically attacks the beta male and then pecks at the female's cloaca, the opening to her reproductive tract. In response to the pecks, the female dunnock may void a droplet of fluid from her cloaca—fluid that contains active sperm, presumably those of the beta male. The alpha male usually concludes a bout of cloaca-pecking by copulating one or more times with his partner. By donating a considerable quantity of his own sperm, he may swamp any beta sperm still remaining within his partner.

As we did in examining the adaptive value of mate-guarding, we can test the hypothesis that male dunnocks promote their reproductive success through "sperm dilution" matings by predicting that in other birds *and in insects too* males with multiple-mating partners will exhibit similar responses. In keeping with this prediction, male mallards typically copulate with their partners immediately after the female has been subjected to EPCs by gangs of rival males, which sometimes overwhelm the male's mate-guarding capacity. This response enables the pair-bonded male to put his sperm at once into the race to fertilize an egg. Similarly, male goshawks copulate at higher-than-average frequency when they return to their mates after a longer-than-average absence, presumably to swamp any sperm their females may have received from intruders in the interim.

Returning to insects again, we have seen that male black-winged damselflies, like male dunnocks and mallards, run the risk that their partners may mate with other males. Against this risk they have evolved counter-responses that are wonderfully similar to those employed by dunnocks. Guarding male damselflies that have been under heavy pressure from intruders sometimes fly at and land on the wings of the egg-laying female(s) in their territory. If a female responds by flying up to a perch, the male will follow and copulate with her again before resuming mate-guarding. These copulations, like those of harassed alpha male dunnocks and paired mallards, appear to be sperm-dilution matings.

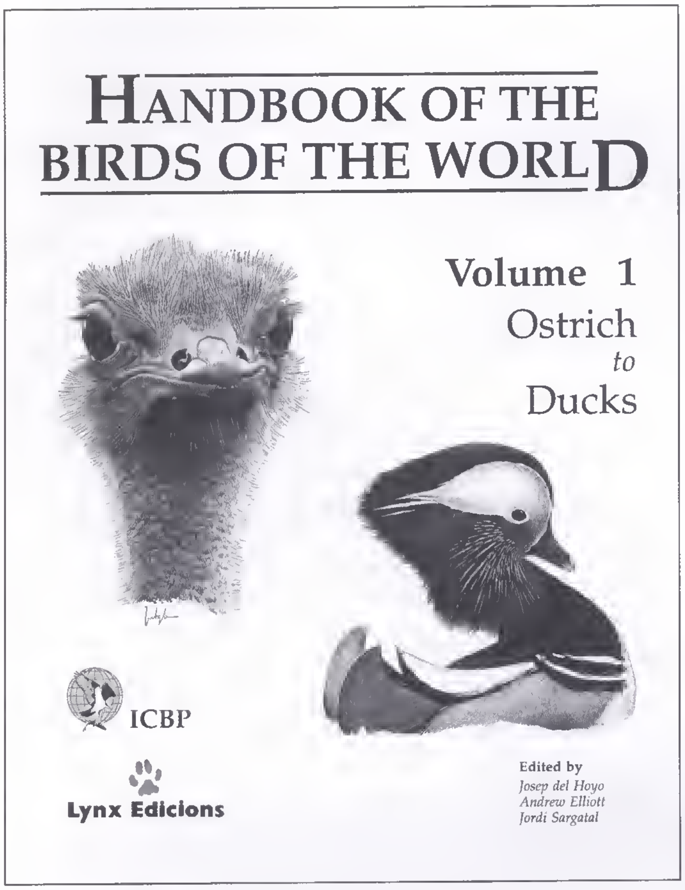
The convergence in behavior between damselfly and dunnock extends to sperm-removal as well as sperm-dilution. Jon Waage of Brown University discovered that the male black-winged damselfly extracts most of the sperm that a rival has donated to his partner before transferring his own gametes. He does this in the first stage of copulation, using his aedeagus, which is armed with assorted spines and horns for the purpose. Only then does the male allow his own sperm to flow into his partner.

Therefore, in animals as different as birds and damselflies, the possibility that a mate will receive sperm from others has resulted in similar patterns of mate-guarding, sperm-dilution, and even sperm-removal tactics. Although many variations on these themes exist among the birds and damselflies, males of both species appear to have mechanisms designed to increase the probability that their sperm, not a rival's, will fertilize the eggs that a partner is about to lay. Among these competitive mechanisms is the close monitoring of females by their partners, who are indeed devoted to their mates—but primarily as a means of ensuring their fidelity.

It is true that this view of the relations between the sexes has an air of cynicism about it. But as someone who began bird watching at age six (first life bird, the EPC-prone mallard) and dragonfly watching about 30 years later, I find that it does not dilute my interest in Abert's towhees to think I know why males skip so energetically after their females. Nor is my appreciation of the aesthetics of black-winged damselflies impaired by recognizing that their behavior constitutes a test of the mate-guarding hypothesis. Monogamy may be largely dead (in dunnocks and damselflies) but happily, the romance of understanding a general pattern in nature lives on. ■

John Alcock is a professor of zoology at Arizona State University. Although he gave up ornithology as an academic career to metamorphose into an entomologist, he retains a fondness for birds. Alcock is the author of a number of natural history books that touch on bird behavior, including Sonoran Desert Summer *(University of Arizona Press, 1990).*

Dunnock by Donald Watson, reprinted from the *Atlas of Breeding Birds in Britain and Ireland* with permission from the publisher. T. & A.D. Poyser



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TIM GALLAGHER

In the Field

WELCOME TO THE CLUB

by Jack Connor

Imagine that you are scanning the sky at your favorite birding spot when a man comes running toward you. You can tell at a glance he's a beginner. His binoculars are cheap, his boots are unscuffed, and his thumb is holding open the crisp, clean pages of a brand-new field guide. "Hey!" he shouts. "There's a black-backed wagtail up the road!"

Which of the following comes closest to describing how you would respond?

A. Start running in the direction he came from, saying, "Wow! That's a super find!"

B. Smile pleasantly and say, "That would be a super find. What field marks did you see?"

C. Raise an eyebrow and say, "That would be an incredible sighting. Are you sure it wasn't a mockingbird?"

D. Shake your head, wrinkle your nose, and ask him, "Who identified it?"

Be honest now, and no looking ahead. Stop and circle your choice before you read any further.

All cognitive processes, writer and educator Peter Elbow has argued, are variations on two root human impulses: doubting and believing. Doubting involves questioning, detachment, disengagement, and criticism—it is an act of separation. Doubters look for the flaws in any method and the possible errors in any statement. "When we doubt," Elbow writes, "we tend to pause [and then] we doubt better." Believing leads to accepting, trusting, and embracing, and so it is costlier than doubting. Doubters stand back; believers jump forward and act. "Believing involves merging and participating in a community: indeed a community is created by—and creates—shared beliefs."

As Phillies relief pitcher Tug McGraw observed, "Ya gotta believe!"

ILLUSTRATION BY ANTHONY TABER

Option D above, "Who identified it?," is doubting at full blast, and though I'd guess few readers would choose it in this artificial test situation, it and similar comments are much more common in the field than they should be. Many of us like to imagine we have entered sacred ground when we walk into the woods. When a self-deluded loudmouth shouts out a blatant misidentification, the temptation to silence the heathen can be overwhelming. Option D is the best put-down of the four choices here, offers you the best punch line to recount at your next birders' get-together ("So I looked him straight in the eye, and I said . . . "), and makes it extremely unlikely that the man with the cheap binoculars will ever bother you again. No friendly conversation could follow such a comment.

Option C, "Are you sure it wasn't a mockingbird?," is only a muted variation of D—a less nasty way to distance yourself from Mr. Wagtail and show him that you know birds and he doesn't. Again, it is unlikely that much of a conversation would follow. I speak from experience here since Option C is one I have used in the field more often than I'd like to admit.

Option B, "What field marks did you see?," certainly can't be called nasty, and this formula can be used in the field peacefully and politely. Mr. Wagtail has asked you to believe a near-impossibility; in turn you are asking him, quite reasonably, to demonstrate his credibility. My guess is option B would win the popular vote among readers of this column and veteran birders in general by a landslide. It fails the test here only because it is not as good a choice as Option A.

And to understand why that is so, just study this week's news. The tropical forests continue to fall, another ozone hole has opened, the Endangered Species Act is under fire, the biggest river in your state still carries toxic wastes, and the woods down your street are being bulldozed. In short, the world needs more conservationists—active conservationists, people who are hooked on the natural world and in the fight for the long haul. Which means the world needs more birders.

Unfortunately, the majority of American citizens find watching birds less satisfying than playing golf, or less fun than shopping, or less romantic than moviegoing, or all of the above—and, let's face facts here, they always will. We can't change the nature of the game, and birders (and active conservationists) will probably always be a minority in this country. We birders do have total control, however, over one factor that keeps some people from joining our ranks, a factor that perhaps pushes away most of those people who are leaning in our direction and would otherwise be easiest to convert: *We don't work hard enough to make them feel welcome.*

> *The next time you meet a novice birder in the field, play the believing game.*

When beginners come up to us in the field, the thought that should be uppermost in our minds is not "How can I show off my knowledge?" or even "How can I correct this misidentification gently?" It's "How can I best say, 'Welcome to the club'?" The moment when a novice approaches a veteran birder is often a critical and delicate one. You might well be the very first birder he or she has ever spoken with. Your primary task is to make certain you are not the last.

Option A is the costliest of the four choices above, the only one that requires that you expend some energy; it is also the most likely to make you a friend. The two of you will trot down the road and discover, almost certainly, that Mr. Wagtail has misidentified a mockingbird or a tern or something else. But the dynamics here are much different than they would be had you corrected his call sight unseen. Having played the believing game, having trusted in his identification as much as he did, you will share in his error. *Credo ut intelligam,* explained Saint Augustine: "I believe so that I may understand."

You might find afterward that you can give him a lesson in bird identification, if you care to (and if you remember to keep your pedagogical touch ever so light). But the crucial lesson will already be completed: he will have learned that birders are trusting, friendly folks and that he is one of us.

I can't end without pointing out one other reason for playing the believing game in the field.

Last fall, I was standing in a circle of a dozen birders at Higbee's Beach at Cape May Point when a car squealed to a halt 10 yards away. "Hey!" shouted the young man at the wheel, "fork-tailed flycatcher up the road!"

He U-turned and drove off in a cloud of dust, too quickly for anyone to judge his credibility by the quality of his binoculars or the condition of his field guide. We were left with nothing to guide us but gut instinct: Were we doubters or believers?

"Did he say fork-tailed flycatcher?" someone asked.

"Yeah, but it's probably only a scissor-tailed," said a second.

"If it's anything," said a third.

"I'm running for it," said a fourth.

And with that, the believers in the crowd were off in a sprint, that became a jog, that—"puff, puff, pant, pant"—became a hurrying walk, and that—"They must have something up there!"—became another sprint when we saw 50 or 60 birders gathered in the road. Finally, hearts pounding, heads throbbing, lungs gasping, we watched a fork-tailed flycatcher flit from tree to bush to telephone line in an open field in New Jersey, two or three thousand miles from its wintering grounds in South America.

Just as a sharp-shinnned hawk chased the flycatcher off the telephone line and into the woods, the doubters arrived. One doubter got a glimpse of its tail as the bird disappeared; the others missed it entirely. Afterward, we tried hard to be sympathetic with them, but it was a tough struggle. We had run, and they hadn't; we saw the bird, and they didn't. I personally still bear a scar on the tip of my tongue. "Hey guys," I kept wanting to say, "Remember Tug McGraw: 'Ya gotta believe!'" ■

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TUNNEL VISION IN THE NEOTROPICS

by Herb Raffaele

It's time for a change in the way we approach international conservation efforts

Concern for neotropical migrants is increasing rapidly in the United States. Coupled with this growing national interest is the realization that because many of these birds winter in Latin America and the Caribbean—far from their North American breeding grounds—the conservation of neotropical migrants can never be achieved by the United States alone. We must cooperate with the countries where these birds spend a part of each year. International cooperation is not a new idea—we've been conducting cooperative waterfowl surveys with Mexico for over 50 years, and other international activities have accelerated rapidly over the past 10 years. It's high time that the process be scrutinized.

Historically, U.S. entities have identified the basic questions we have about "our" birds on their nonbreeding grounds, and then proceeded to answer them. For example, researchers might ask, "What is the abundance and distribution of the migrant?" or "What are its food and habitat preferences?" Most North American researchers contentedly go off and answer these questions on their own. A few of the more enlightened ones go a step further and involve local biologists in the investigation. Then the research results are sent to local institutions.

This approach is the *least* effective one we can take, conservation-wise. By limiting local involvement, we do little to strengthen the capacity of local conservationists. When U.S. researchers do all the science, the knowledge gap between us and local conservationists increases. And if we don't actively involve local scientists and institutions, they are hardly likely to embrace our conclusions, and may in fact dispute them.

Furthermore, we may not be asking the right research questions. Often, we assume that increased knowledge about a species is critical to its conservation, that applied research equals conservation. This is not necessarily the case. Questions that interest us may be of little concern to local management.

Why, for example, should the islands of the Caribbean focus on the piping plover, generally a transient there, when most of their endemic parrots are close to extinction? The fact of the matter is, most countries will—and should—give significantly greater attention to their endangered endemic species than to wide-ranging migratory birds.

We feel proud that we have increased the number of Latin American conservationists working on neotropical migrants, but has this been at the expense of the resplendent quetzal and the hyacinth macaw? We argue that by saving migratory species we also help endemics, but that's not necessarily true. Some habitats in Latin America that support the greatest numbers of migrants harbor extremely few endemics. Most wetlands are a case in point.

And even if we learn all there is to know about neotropical migrants in Latin America and the Caribbean, will this take us a significant step closer to conserving endemic species? Not really. In addition to the problem of habitat differences, we have trouble accepting the small role scientific knowledge, no matter how complete, plays in species conservation. This is particularly the case in heavily populated developed countries with differing stresses, priorities, and cultural attitudes.

It is easy to attract local biologists to study neotropical migrants and their habitats. The lure of research money to fund field work, the glamour and sense of credibility that come from associating with a well-known foreign scientist, and the potential for international travel are more than enough to entice many local investigators. If Latin American countries had an abundance of researchers and conservationists, this scenario would be fine. But this is not the case. One of the most critical factors hampering conservation efforts throughout Latin America is the scarcity of trained professionals. Local scientists who study migrants are in most cases drawn away from other conservation efforts focused on local species and habitats.

The bottom line is that while we in the United States want to conserve "our" migrants, in Latin America this goal can be achieved only indirectly. For international conservation efforts to be truly effective they must do the following:

- address local priorities (and only secondarily integrate ours);
- train local personnel, through local institutions;
- assist local institutions to implement their priorities, not just ours;
- involve local resources, aiming toward local sustainability;
- treat research as one small component of conservation, rather than its backbone. Integrate environmental education, monitoring, planning, management, and public awareness campaigns into cooperative conservation projects;
- integrate U.S. assistance into the appropriate local institutional structure. For example, don't work with a nongovernmental organization on a management plan for a protected area that is administered by a federal agency without the clear support of that agency;
- monitor projects, and adapt them to changing conditions.

Unless we assist Latin American and Caribbean countries in a way that addresses their needs rather than our wants, our conservation efforts on behalf of neotropical migrants are unlikely to succeed. ■

Herb Raffaele is coordinator of Western Hemisphere programs for the U.S. Fish and Wildlife Service. He has over 20 years of experience in conservation and research in the region.

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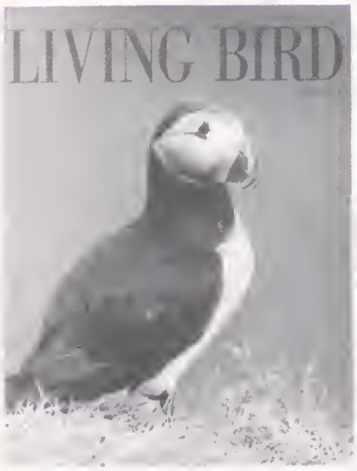

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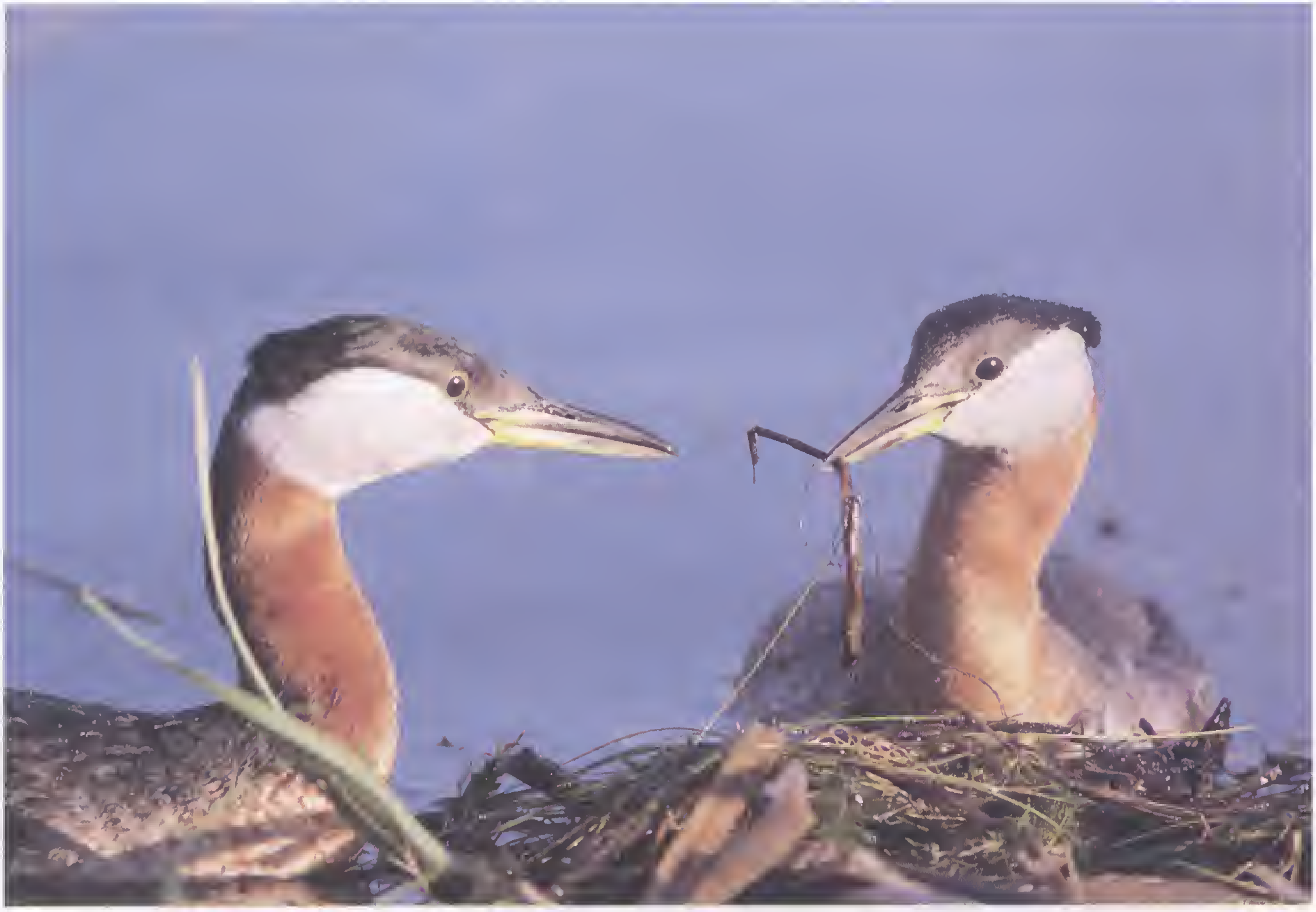

Red-necked Grebes: A Nest Portrait

In the long twilight of a northern evening in Canada, two red-necked grebes work on their nest together. These colorful birds gather decaying aquatic vegetation—reeds, marsh grasses—and construct a floating nest, which is usually anchored to rooted bulrushes or reeds. Nesting away from the shore provides added protection from land predators.

Photographer Tim Gallagher spent several weeks one summer documenting this pair's courtship and nesting activities on a shallow beaver pond in Alberta. The grebes were inseparable during their lengthy courtship. Their calls, like wild laughter, drifted over the pond day and night as they enacted their nuptial ritual, swimming in tandem with head feathers raised.

Critics' Corner

THE BEST IN BIRD-LISTING SOFTWARE

by Jeff Wells

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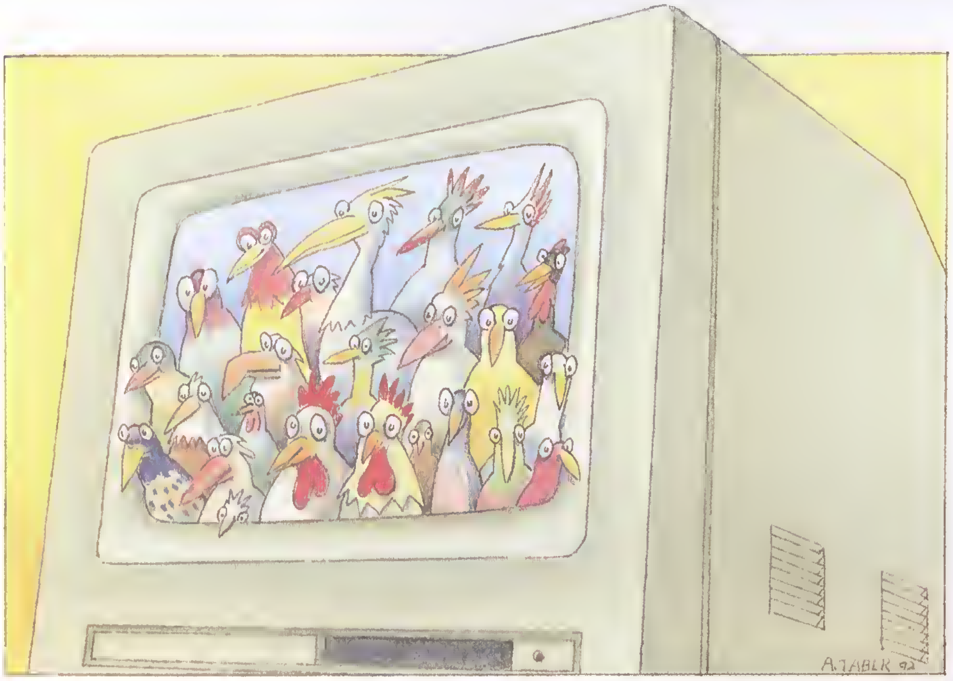

ILLUSTRATION BY ANTHONY TABER

I saw my first common puffin 10 years ago. After a day spent squinting into the glare and struggling with seasickness, I was ready for bed as soon as I got home. But I still had to update my lists. Dutifully, I wrote the day's bird list into my notebook, filled in the date, location, number, and comments in a separate life list notebook, then took out a third booklet to check off the species on my year, state, and U.S. lists. Only sheer determination kept my bloodshot eyes open long enough to finish the job.

Sound familiar? Here's the updated scenario: Last year, when I got back from admiring a hawk owl in Pennsylvania, I turned on my computer, and 10 minutes later all my lists were complete.

Today many people are opting to computerize their bird lists, a trend that hasn't been overlooked by birders with an entrepreneurial spirit. Bird listing software offerings have multiplied like starlings in Central Park. This review will help you choose the one that's right for you.

All of the programs reviewed here run on IBM compatible machines. Each software package was scored for 10 features: ease of installation, ease of data input, listing usefulness, usefulness for record-keeping, information system capabilities, speed, flexibility, bugs, printing, and cost. Bird-listing software for Macintosh computers will be reviewed in an upcoming issue of *Living Bird*.

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(805) 963-4886

PRICE: $59.95 plus $3.00 shipping & handling. BIRDBASE 2 can also be purchased with a world bird list for $99.95.

REQUIRES: DOS 2.0 or higher, one 3½" floppy or two 5¼" floppy or one hard drive, 256K RAM

BIRDBASE menus are logical and nice-looking, and you can select species from an on-screen list. (I did have some difficulty finding yellow-rumped warbler on a screenful of warbler names—a different screen design might make it easier.) You can generate state, nation, county, and residence lists, as well as special lists, including sightings of a single species and lists for specific time periods. You can also get a list of all the birds missing from your North American list—and the number of species on each list is displayed.

BIRDBASE is the fastest of all the programs I tested for data entry. One of the few complaints I have is that the program will run only with the original program disk in the disk drive—this could be a problem if the original disk becomes damaged.

For the computer neophyte who occasionally birds outside of North America, and whose main objectives are fast data input and list tracking, BIRDBASE is a good choice.

BIRDLIST

Bird Commander, Inc.
P.O. Box 34238
Bethesda, Maryland 20817
(301) 229-7002

PRICE: $99.00

REQUIRES: DOS 1.1 or higher, two floppy or one hard drive, 128K RAM

Installation is fast and efficient, although I had to change a line in the BIRDLIST.BAT file in order to get it to print correctly on my printer, a Hewlett-Packard Deskjet+. BIRDLIST menus are simple and self-explanatory, though there is room for improvement.

Inputting to BIRDLIST takes twice as

long as it does with BIRDBASE, the fastest program. You choose names from an on-screen list, and it doesn't scroll very quickly. You can speed things up by limiting the source list to a small geographic region to narrow your choices. Another quirk is that you move down the list by pressing the PAGE UP key—the down arrow key would be more logical.

BIRDLIST displays lists for North America, Canada, the United States, all states and provinces, and discretionary lists. The total number of possible species, number of species seen, and the percentage of possible species seen are displayed at the end of each list. You can also view and print target lists, on which the species you've already seen appear in lowercase. A geographic file lists the number of possible birds in each state and province, and a bird file lists the states and provinces where each species had been recorded. Tony White, BIRDLIST's distributor, publishes a quarterly newsletter for users that tells of additions to state and province lists.

BIRDLIST does not have the flexibility of some software packages: you can't search for all listings of a particular species, you can't call up lists within a range of dates, and you can't enter the number of birds seen or any notes.

BIRDS

Scientia Enterprises
2536 Cedar Canyon Drive
Marietta, Georgia 30067
(404) 951-8252

PRICE: $75.00

REQUIRES: DOS 2.1 or higher, BASICA, two floppy or one hard drive, 128K RAM

BIRDS was one of the first commercially available bird listing software packages. It is written in BASICA, a programming language that many consider obsolete. BIRDS has some nice features, but unless you have a very old computer system, you will probably find one of the other software packages easier to use.

The program was originally written for a two-drive system and requires BASICA in order to run. The screen is set so it can be run with a television as the monitor—handy six or eight years ago but less so today when most computer users have monitors.

BIRDS does many of the same things as other bird listing software packages: life, country, state, year, and other lists. Target lists can be generated as well. It's unfortunate that BIRDS hasn't been upgraded (using QuickBASIC, for instance—hint, hint), because the program has some features not found in other packages. For example, you can generate checklists by choosing which species you want to include. Christmas Bird Count coordinators would love this feature—they could give count participants a list of expected birds. Another unique feature is the ability to export lists in spreadsheet format (Lotus 1-2-3, for example). I look forward to an upgraded version.

AVES

Ecosystem Software
638 El Dorado Avenue
Oakland, California 94611
1-800-925-BIRD

PRICE: $65.00 (Free demo disks available)

REQUIRES: DOS 2.0 or higher, two floppy or one hard drive, graphics-capable computer, 256K RAM

One of the most compelling features of AVES is its speed—everything happens so quickly that you spend little time waiting. Although AVES doesn't have an installation program, the directions in the manual are easy to follow. Menus are logical and easy to understand. Though AVES does not give you a list of species to choose from, it does allow you to type in a bird's full name or the standard four-letter acronym.

Many different lists can be generated from the field notes you input: first sightings, all sightings, sightings for a single species, a specific date or time period, or a particular geographic location. It's easy to get a count of the number of species on your state, United States, Canadian, or life list.

AVES has fancier graphics than any of the other software packages I sampled, and several other useful features. First, it will generate checklists for any area in the lower 48 states in any season and any habitat. They're not as accurate as lists by local experts, but they're pretty good. Also, the checklists tell you what page numbers to consult in your field guide for information on each species (you can choose which guide). The last feature, unique to this package, is the ability to display the North American summer and winter ranges of U.S. birds.

AVES is a good choice for novice computer users who want, in addition to listing functions, the ability to access information on bird ranges and bird habitats at the touch of a keyboard.

BIRDSTAR

LBJ Expert Systems
96 Craig Drive
Kitchener, Ontario
Canada, N2B 2J3
(519) 894-9308

PRICE: $39.95

REQUIRES: DOS 2.0 or higher, one floppy or one hard drive, 320K RAM

BIRDSTAR was released fairly recently. The price is low, and installation is easy. Unfortunately, there aren't many good points after that. You type in bird names instead of choosing from an on-screen list. Inputting your lists takes three times as long as BIRDBASE, the fastest program. If you misspell a species name, it may appear as a new species on your list; hit "h" instead of "j" and add "blue hay" to your life list.

The copy I reviewed had some bugs—none serious enough to make the program crash but frustrating nonetheless. One curious feature of this software is the list of "types" to choose from when inputting each bird record: warbler, sparrow, ground/perching, tree clinging, swallow, owl, hawk, ground chicken, marsh chicken, sandpiper, long-legged wader, gull, duck. The first species I entered was horned grebe . . . where does that fit in?

FLEXI-LIST

Parkway Software
P.O. Box 275
Villanova, Pennsylvania 19085
1-800-356-7613

PRICE: $50.00 plus $3.00 shipping & handling

REQUIRES: DOS 2.0 or higher, one floppy or one hard drive, 256K RAM

Installing FLEXI-LIST is relatively easy, and the menus are simple and straight-

	Ease of Installation	*Data Input*	*Listing Use*	*Record Keeping*	*Information System*	*Speed*	*Flexibility*	*Bugs*	*Cost*	*Printing*	*Overall Rank*
AVES	3	3	4	3	4	4	3	4	3	4	4
BIRDBASE	4	4	4	3	1	4	3	4	3	4	4
BIRDLIST	4	2	4	1	2	4	2	3	2	4	3
BIRDS	1	?	3	3	2	?	2	?	3	4	2
BIRDSTAR	3	1	2	1	0	4	1	2	4	3	2
DATAHAWK	4	3	4	3	2	4	3	4	2	4	4
FLEXILIST	3	3	3	1	1	4	2	4	4	4	3
PLOVER	4	3	4	4	1	4	4	3	3	4	4
SIALIS	4	2	3	2	1	4	2	2	4	4	3

4 = Excellent or Best 3 = Good 2 = Adequate 1 = Poor 0 = Very Poor or Worst ? = Could not evaluate

forward. Inputting speed is comparable to AVES and PLOVER. To add a species to a list, you must type the standard four-letter acronym (the program will accept similar non-standard acronyms). Once the fourth letter of the acronym is typed, the full species name immediately appears on the screen. The speed of this action is admirable, but you have no opportunity to check your typing—why not have the user hit ENTER to make the species name appear? In a few cases I couldn't remember (or figure out) the correct acronym, but after you use the software for a time the acronyms probably become second-nature.

FLEXI-LIST has more limited listing options than many of the other programs. For example, you can't input daily lists with numbers, then generate state, year, country, or special lists. The program is designed to check the entries under each list for the codes you have inputted. For example, if you were on a birding trip that included stops at Cape May and Brigantine, you could enter C and/or B for each species seen. You could then find out how many species you saw at either site or both.

FLEXI-LIST has a number of print options and allows printer escape code manipulations for those who want complete printer control.

SIALIS

Alfred Milch
461 Palmer Avenue
Teaneck, New Jersey 07666
(201) 836-1496

PRICE: $75.00 plus $3.00 shipping and handling (demo disk for $3.00)

REQUIRES: DOS 2.0 or higher, hard disk, 500K RAM

This program comes with a list of the birds of the world. The manual describes list-naming conventions that are important to follow when entering a list. You choose a limited geographic area from a simple menu, and see another menu with four major subdivisions of birds. After choosing one of these subdivisions, you are presented with a list of bird families. These family menus are the same no matter which geographic area you choose. For instance, even though I restricted my lists to North American species, the list of families included Cassowaries and Sun Grebes. Having all those families on the menu makes it difficult to find the ones you want. Also, some birds are listed under families that North American birders might not be familiar with. To find blackbirds I had to look under "Troupials and Allies"—not a name that comes readily to mind when looking for red-winged blackbird.

I found the method for choosing species a bit awkward. First you enter the number of species from the list that you wish to input. Then you type in the code number for the species (code numbers are listed beside the species name). Many species do not follow AOU conventions. For example, common grackle is listed as two species: purple grackle and bronzed grackle.

The menus in SIALIS can be somewhat confusing, and the manual isn't particularly useful in understanding how the program works or what it can do. Although a number of lists can be generated, including lists of all species seen in a particular family, SIALIS seems less flexible than many of the competing programs. In general, the user interface is not as good as it is in the better software packages, though the listing functions available are similar.

PLOVER

Sandpiper Software
9 Goldfinch Court
Novato, California 94947
(415) 892-9871

PRICE: $65.00 plus $3 shipping & handling. Sibley-Monroe world list of birds available in compatible format: $60 for common names, $75 for common and scientific names.

REQUIRES: DOS 2.0 or higher, two floppy or one hard drive, 320K RAM

PLOVER has an easy-to-use installation routine, and the manual is clearly written. It took me about the same amount of time to input my lists in this program as it took in AVES—about 10 minutes longer than in BIRDBASE. PLOVER has more flexibility than other software packages. For instance, to add a species you can type the full bird name, the four-letter acronym, or choose names from a master list. The master list, however, contains all the species in North

America, so it's tedious to scroll through. A world bird list can also be purchased for use with PLOVER.

Choosing where to store data is easy with PLOVER. You can generate and print lists of virtually any kind. One unusual feature is the ability to calculate some simple statistics from your lists. You can review the first and last observation of a species, the mean arrival and departure dates, and the earliest and latest dates for a season.

Of all the software packages I reviewed, PLOVER is my personal favorite. It's the best choice for listers and record keepers who need maximum flexibility and control over their data.

DATAHAWK

Turnstone Software
1838 Barry Avenue, Suite 12
Los Angeles, California 90025
1-800-654-5676

PRICE: $89.00 plus $4.00 shipping & handling

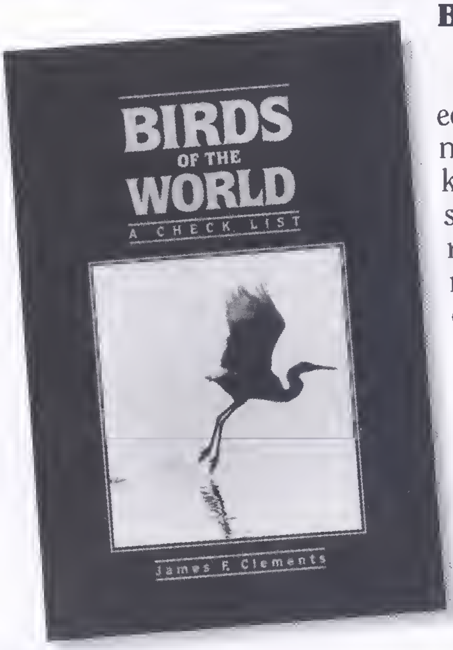
REQUIRES: DOS 2.1 or higher, one hard drive with at least 1.3 MB free, 512K RAM

Installation is menu driven and simple. Inputting is relatively fast, with easy-to-use pull-down menus. You can enter your lists in a number of ways, with space for notes and numbers. For birders who keep county or region lists, DATAHAWK allows the designation of up to 27 wild card regions. You can generate lists of species seen and target species (as well as the number on the list) for the United States, Canada, each state or province, specific locations, and specific time periods. Lists of sightings of a single species can be displayed as well.

DATAHAWK prints better-looking checklists than any of the other programs, and you have several options for checklist set-ups. I printed out a three-column checklist of the birds of New York that was a manageable three pages long. If you want excellent field checklists for trips anywhere in North America, DATAHAWK is the program for you—as long as you have a hard drive. ■

Jeff Wells is a birder and a graduate student at Cornell University. He studies grassland birds in his favorite listing area, the state of Maine, where he has seen 309 species.

BIRDS OF THE WORLD: A CHECKLIST
By James F. Clements, Ph.D.



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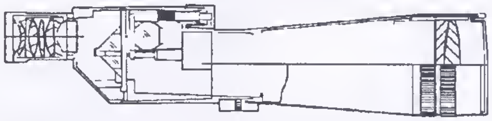

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ON THE ROAD AGAIN

by Pete Dunne

It was late, real late. The banquet was over. The speaker had left the podium. And the motel's banquet crew was waiting impatiently for the members of the American Birding Association (ABA) to quit the room—a thing they were disinclined to do.

"Now what?" the banquet crew muttered to themselves.

"What's the deal?"

"What's the holdup?"

"I wanna go ho-o-ome!" one particularly gifted member of the crew wailed.

Well, the crew didn't go home, not right away. Instead, they went on a tour to a continent that none of them could claim familiarity with. To their utter astonishment, it was the continent they lived on: this continent.

As the banquet crew watched, 20 slides were projected, each depicting a landscape, a scene. Each was different. None was identified by edifice, banner, or sign.

One slide showed a chalk-colored trail straight cut through a tunnel of living trees. It had a tropical flavor.

"Snake Bight," 500 ABA members shouted as one, putting a name to this famous Everglades avenue (a place whose mosquito hordes have drawn more blood than Genghis Khan and the Red Cross put together).

Another slide showed an arid, desert plain, pinched by mountain peaks until it formed a verdant, green canyon.

"Cave Creek," the birding chorus chanted—singing the praises of Arizona's trogon epicenter.

Still another depicted a misty, shimmery, rock-encrusted cove—a very beautiful but inhospitable looking place.

"Attu," most of the ABAers shouted.

"Casco Cove," a precision-minded minority asserted.

The waiters and waitresses just stared in disbelief. What they were witnessing couldn't have been staged. It was far too spontaneous. But just the same, it couldn't be real, could it? Five hundred people, drawn from across the continent, simultaneously identifying patently obscure corners of the planet.

I mean, it wasn't like someone was holding up flash cards of the Manhattan skyline, or Disney World. These people, these *birders*, were pinning names to photos of rocks and trees. They were tossing off names to places that most of the young waiters and waitresses in this college town had never even heard of.

There are a lot of things to like about birding, but one of its most compelling attributes is the avenue of discovery that it paves. It starts at your own front door and goes on . . . to a boulder-strewn outcropping straddling the crest of the Kittatinny Ridge, where excited onlookers point skyward as migrating hawks hitch their fortunes to the wind; to a crumbling brick fortress mantling a coral key, where great soaring birds hang motionless against the clouds; to a roadside picnic area off a two-lane Arizona highway . . . or an accidental sea in the California desert . . . or a seawall with its back up against an old New England shipping town . . . .

It's a road that goes everywhere and, once you step upon it, can sweep you any place, any time. The road savvy you gain bonds you to the continent and to fellow voyagers: fellow birders.

Don't you think it's remarkable that two total strangers could meet on a bench in Cape May Point, New Jersey, and converse about a particular telephone pole in Madera Canyon, Arizona—one boasting a strategic (and occupied) woodpecker hole? Even more remarkable, at the end of this conversation (which really did happen), a *third* party advised the conversant pair that the elf owl had moved "one pole over."

Have you ever marveled at the conversations of professional bird tour leaders who in the course of giving directions can plot a mental course . . .

"Over the cattle guard at the top of the hill."

"Right."

"Down to the water tank where the road turns right."

"Okay."

. . . to intercept some pale, prairie plover nesting in an isolated pasture in an obscure corner of a state that most Americans only associate with packed powder snow and a brand of beer that brings back the spirit of the sixties?

In the course of their quests, birders gain a sense of the continent that even a long-haul trucker might envy. Birders know where to get the thickest chowder in Gloucester, Massachusetts, and the spiciest chili in Brownsville, Texas; know in which states "coffee regular" means with milk and sugar and in which states "regular" means black.

But most of all, and best of all, birders know that at any time they choose, they can just get up, put their feet on that old familiar road, and let it sweep them to adventure in old familiar haunts or discovery-filled corners—any place, any time. Even right now (if you've finished your coffee). ■

ILLUSTRATION BY JEFF SIPPLE

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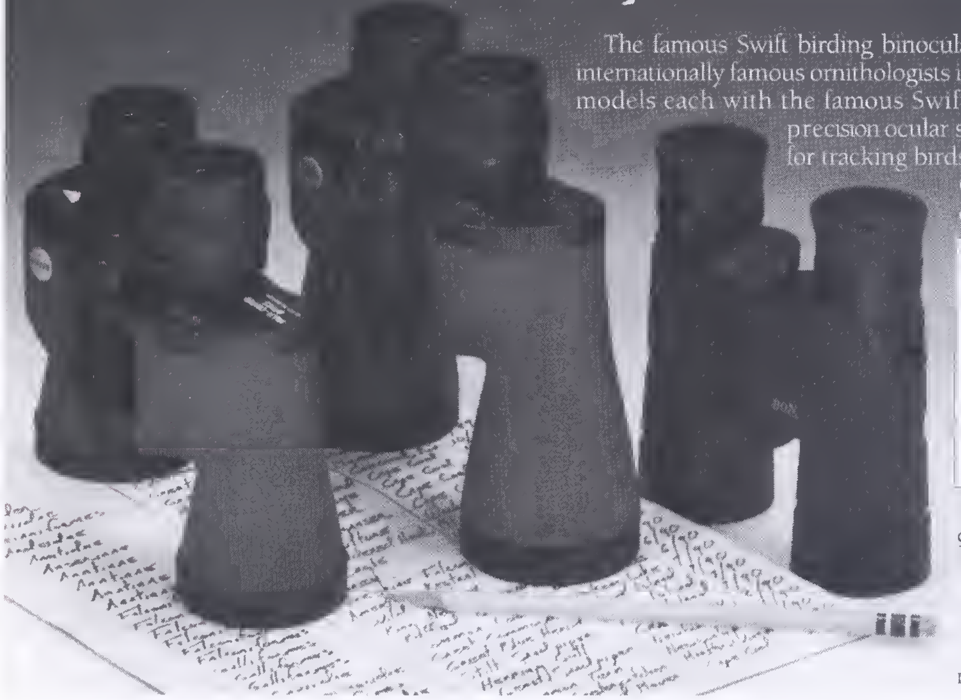

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